BRITISH WOODLANDS

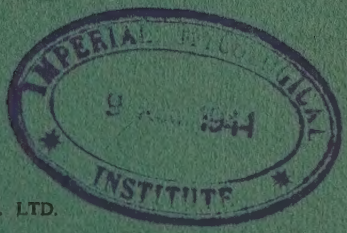
AS ILLUSTRATED BY

LESSNESS ABBEY WOODS

A General Survey of the Flora and Fauna (with an Introduction by C. H. GRINLING); containing also a Map, Charts, Photographs, Explanatory Notes, Historical Preface, Botanical Survey, and numerous lists representing the various groups of plants and animals recorded for the woods.

BY

ST. JOHN MARRIOTT



London:
GEORGE ROUTLEDGE & SONS, LTD.

Woolwich:
PIONEER PRESS LTD., 3, NEW ROAD.

1925

TWO SHILLINGS AND SIXPENCE.

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INTRODUCTION.

" The author of the following letters takes the liberty with all proper deference of laying before the public his idea of parochial history which he thinks ought to consist of natural productions and occurrences as well as antiquities. He is also of opinion that if stationary men would pay some attention to the districts in which they reside and would publish their thoughts respecting the objects which surround them, from such materials might be drawn the most complete county histories."—*From Gilbert White's Preface to the "Natural History of Selborne," January 1st*, 1788.

What is good for one village, town, county or country is good for all when love of nature is the goodness. I would fain see this book find its way wherever there is an individual or group seeking this goodness and wishing for a comrade on the way. St. John Marriott is in the true line of descent from the author of the words which I have quoted.

When I came to Woolwich in 1889, J. W. Horsley, M.A., was the leader of the little group of naturalists who called themselves the North Kent Natural History Society. Presently W. T. Vincent founded the Woolwich Antiquarian Society. Through the one group Woolwich has sought to gather its records of nature, through the other its records of man. In this volume St. John Marriott fuses the two records for the woodlands of Lessness in the true spirit of Gilbert White.

A long line of workers has haunted the hill slopes and the woodlands from Shooters Hill to Abbey Wood and beyond. Many times I have wished to see the historical associations of this countryside recorded. In 1907, J.W. Tutt, F.E.S., promised to write this history. Later, when he died, G. S. Boulger, F.L.S., F.G.S., promised to gather up the records. But to him, too, death came before the promise could be redeemed. To others I have made the appeal. In the local collection of the Woolwich Library there is already material for such a history and the British Museum is near at hand. It is suggested that Linnæus on a visit to Deptford ranged through our woods and over our commons.

My earliest association with Lessness Woods was in 1907. For that year at the suggestion of W. T. Vincent and myself the South-Eastern Union of Scientific Societies was invited to hold its Congress in Woolwich. The North Kent Natural History Society had in its possession the first receipt issued by the Union to an affiliated Society. The Woolwich Antiquarian Society had been a regular contributor to its activities. The invitation was accepted and the visit of the Congress left a lasting mark on our Woolwich life. As a

direct outcome we have the volume of "Woolwich Surveys" published in 1909; the exploration and excavation of Lessness Abbey; Elliston Erwood's work on the earthworks at Charlton and on the Roman period in N.E. Kent; the founding of the Woolwich Historical and Scientific Society and other subsequent movements which I hope will one day be recorded.

The volume of "Woolwich Surveys" was entitled "A Survey and Record of Woolwich and West Kent, containing descriptions and records brought up to date of the Geology, Botany, Zoology, Archæology and Industries of the district, with a brief photographic commentary, in commemoration of the Twelfth Annual Congress, 1907, of the South-Eastern Union of Scientific Societies." This volume subsequently led to the publication of similar volumes at St. Albans, Hampstead, Bournemouth and Tunbridge Wells. It also helped to make ready for the formation of a Regional Survey Section of the South-Eastern Union of Scientific Societies.

The founding of the Woolwich Historical and Scientific Society may well have far-reaching results. Just as the South-Eastern Union, the Yorkshire Union and others had been founded on the model of the British Association, so it was felt that there was a need for intermediate bodies covering smaller areas and doing more intensive work, themselves modelled on the main lines of the Unions. It was felt that the various scientific societies in each such area needed to be linked together for mutual aid and that the best results of each could only be reached when the contribution that each makes to Science is freely and readily at the disposal of all the others. It is interesting to note that at the very outset the Woolwich Historical and Scientific Society undertook to make itself responsible to do what lay in its power towards the publication of :—

(1) Supplements to "Woolwich Surveys" from time to time to bring all our local knowledge up to date.

(2) Succeeding volumes of surveys to include the wide ranges of observation not touched upon in the first volume.

(3) A popular edition with a popular preface.

It was felt further that one of the chief aims of the Society should be to encourage and spread such monographs as the present volume on Lessness and to urge the importance of observational notes and life histories.

No sooner had the Historical and Scientific Society come into existence that it was invited by the Libraries Committee of the Woolwich Borough Council to form a Museums Committee which should become the Advisory Committee of the Council for its Museum in connection with the Plumstead Library and for subsequent museum developments. A growing band of eager workers has been gathering round the Plumstead Museum and much good

work has been begun. The various collections have been overhauled, classified and furnished with descriptive labels ; a seasonal exhibition has been maintained of flowering plants, trees and shrubs, mosses, liverworts, fungi, lichens, mycetozoa, and of available forms of animal life, which has been of continual interest to the children of the Borough as well as to amateurs and other workers ; excellent series of museum lectures with lantern slides have been delivered by well known lecturers each winter ; microscope evenings have been held regularly during the winter months ; forays and excursions have been arranged to follow the seasons of the year ; teachers have been invited to bring their classes to the Museum and help has been given in many ways to those who are interested in history and science.

It may well be claimed that the present volume on Lessness owes its origin largely to the foregoing chain of events. The woodlands had always struck the imagination of our local workers. Naturalists who made Woolwich their home found their way to the woods unerringly. Napier, who came as a mathematical instructor to the Royal Military Academy, stumbled across a volume of " Woolwich Surveys," found that the mosses were inadequately represented and made his way to the woodland. Marriott followed in his traces. It was not long before he gave us a small volume on " Our Summer Visitors " among the birds.

Two main streams of tendency have been in the minds of our local naturalists—the need of intensive survey and the need of synthesis. The present monograph should open the way to local naturalists and others to tackle much work that is waiting to be done. It would be hard to find a better guide and companion and fellow worker than the author of this monograph. I dare set no limit to the work that can be accomplished intensively and then extensively by a closely knit group of workers. Ever since the visit of the South-Eastern Union Congress to Woolwich and the publication of " Woolwich Surveys " it has been our great desire to enlist observers and workers to fill the gaps in our observations and to strengthen the weak links in our chain of knowledge. We believe that this should be a first aim in the renewal of life of our local scientific and historical societies. While Lessness Woods are still intact we invite enthusiasts and eager workers on the one hand, and beginners who are feeling their way on the other hand, to join our ranks.

Alas, the woods are no longer intact. They are even in jeopardy. For years past we have been urging that the woodlands should be secured for the people of London as a nature reserve and bird sanctuary. But if this end is to be attained swift and decisive action is needed. I quote a paragraph from the letter of a correspondent : " During the last decade most of the woodland under consideration has been offered for sale, but it was only during last winter that any considerable acreage was sold. Then seventy-five acres were

purchased by a gas company and fenced off. This portion still remains intact under the same tenancy as the rest of the woods, but it is more than probable that unless steps are taken to secure at least part of the woodland as a nature reserve, little of it will escape destruction during the next few years."

May I make an appeal to the readers of this volume for Lessness as a haunt for the young ? The woodland spirit presses to the fore for renewal in our life. The leagues of youth are full of promise. I have before me " Notes and Suggestions on Policy and Programme for Camelot Groups of Kibbo Kift." Recently for a whole week Woolwich old Town Hall was filled with eager groups of children, either with their teachers or alone, taking advantage of an exhibition of Regional Survey arranged by the Woolwich Libraries Committee and our local groups of workers. A letter came to me the following week from one of the Kibbo Kift tribes offering its services to the Woolwich Historical and Scientific Society. So links are forged ; help becomes available and the researches of scientific workers may be fertilised by the eager observations of the young. Woolwich has put itself into the forefront of London in all that it has done for the securing of open spaces and the winning of London's heights on Shooters Hill. It sounds its call to London for the saving of these secluded haunts for the quiet student of life and history.

Listen to Nature ; she calls quietly yet incessantly ; she repeats her call at every need.

Let her call go without response ; there will be no reproach from Nature ; but there will be a reproach in your own heart and a rift hard to cross between you and her.

Listen and respond eagerly till guidance comes to the very heart of Nature and her ancient wisdom.

C. H. GRINLING.

EXPLANATORY NOTES.

Although the sole aim of the present work is to provide a general survey of the woodland it has been found expedient, if not necessary, to commence with a brief history of the Abbey because many of the more salient features of the woodland could scarcely be adequately appreciated without at least some reference to that history.

In the arrangement, it was considered of advantage to divide the work following the historical preface into two parts—the first devoted to the flora and the mycetozoa, the second to the fauna, including fossils.

Moreover, in order to facilitate reference to the old records together with other observations intimately connected with any particular group in either part, as also to prevent the general text from being overburdened with such matter, it was decided to preface each list with notes containing such records.

In order to follow the main portion of the work it will be necessary to refer frequently to the attached map which is divided into three-inch squares so that any site mentioned in conjunction with the number of the square may be readily located. The map also shows the geological formations. With regard to the localities marked on the map the few names employed on either ancient or modern maps have been utilised, but in the absence of names for any of the paths, fictitious names have been supplied in order to facilitate brevity in description. In several cases where a path runs through or near the site of one of the old "Coppice Woods" the name of that coppice as marked on ancient maps has been retained for the path: in all other cases the name refers to some special feature or conspicuous plant or plants near the path, to history connected with it, or to the nature of the path itself.

The signification of the various shadings, symbols and abbreviations employed in connection with either the map or any of the charts is included with the respective map or chart to which they refer or in the list of abbreviations.

The seventy-five acres of the woodland purchased and fenced off since the commencement of this work includes the whole of the area to the east of the Chalky path, in Boarer's wood. The fence adjoins that path from the northern border to Utrect path, from whence it extends to the southern border in the direction of the line marked "New Fence" on the map.

Of the numerous lists in both divisions it is freely admitted that several are not fully representative, but it is considered that even incomplete lists are better than none as they at least furnish a basis for future study which may incite others to carry on the work more seriously.

If the perusal of the following work should induce others either to follow up the survey of the woodland more closely or to commence a survey of other woodland, one of the chief objects of the writer will have been achieved, though the pleasure derived in the compilation of this work is in itself a sufficient recompense.

I trust that C. H. Grinling, B.A., whose encouragement throughout the work has been invaluable ; F. O. Whitaker, who has not only prepared the geological map but has also most kindly transferred all the items from my map on to his ; J. F. Bevis, B.A., F. J. Epps, E. M. Holmes, F.L.S., G.C. Hodson, A. G. Tansley, M.A., F.R.S., and H. J. Turner, F.E.S., who have all so generously given their assistance will accept my grateful thanks. I am also indebted to several members of the Place Name Society including C. F. Hardy, F. S. Lamprey, M.A., and A. E. Dean, who with F. O. Whitaker have kindly furnished information as to the correct name for the Abbey. S. Priest, F.G.S., has most kindly supplied the geological and scenic notes given in extract and C. R. A. Hodsell, of the Woolwich Photographic Society, the excellent photographs. To the many others who have given help, as mentioned in the various prefaces, my heartiest thanks are due.

HISTORICAL PREFACE.

In 1178 A.D. on the western border of the parish of Erith in Kent, "on an almost flat ledge of land sloping down on the north to the coastline and rising more steeply behind in the tree-covered slopes of Westwood and Bostall," Richard de Lucy, Chief Justiciar of England, founded the Augustinian Abbey known by the various titles of Lesnes, Lesness, Leesney or Lessness. After the decease of the founder little more than a year later, the Abbey, together with additional buildings and endowments from time to time, passed into the possession of numerous Abbots in succession, until at length the Monastery was suppressed and dissolved in 1525, under Papal Bull obtained by Cardinal Wolsey. In 1534, after the fall of Wolsey, the site of the Abbey, together with the Manor of Lesnes and Faunts, became the property of William Brereton. After the execution of Brereton for treason the estate passed through several hands until eventually sold by Sir John Hippersley to John Hawes of London, who, before his death in 1663 bequeathed it after the decease of his wife, to Christ's Hospital, in whose possession the property has remained ever since. A plan of the site, dated 1655, reproduced from the original in the hands of that Hospital, is figured in "Lesnes Abbey" by A. W. Clapham, F.R.S., to which we are indebted for most of the above notes. This work deals admirably with the successful excavations carried out during 1909-13 by the Woolwich Antiquarian Society at the instigation of the late W. T. Vincent. The excavations, though referred to *en passant*, may be dismissed without further notice as quite alien to our subject, but the plan, which includes the woodland, is invaluable, as we hope to demonstrate later. Meanwhile we pass on to consider the property as viewed at the present time.

With the exception of a small portion of the woodland cleared for allotments during the last five years, the Nurseries long established in the south-eastern corner, the Lessness and Utrecht Houses with grounds, and a narrow strip of land recently acquired for widening Woolwich Road, which total only a comparatively few acres, the whole estate is farmed by W. Baldock, who occupies the farmhouse built in 1845, on lease from the Hospital. As in accordance with the current ordnance maps the tenancy is now generally known as Lessness, that title has been retained for the Abbey, although it is recognised that from an antiquarian point of view either Lesnes or Lesness may be a more exact appellation. The varied opinions as to the correct name are another reason for using the one marked on the map. (See Appendix A.)

Returning to the description of the property we find that high walls, probably in part erected from the stones of the ruins by Sir John Hippersley,* form a spacious rectangle enclosing a considerable

* "Lesnes Abbey," p. 39.

portion of the site of the Abbey buildings. One end of the rectangle abuts on the farmyard, the other joins up to the woodland. The homestead orchards, pastures and arable lands, form the rest of the northern boundary of the woodland from east to west. The Hospital plan shows that no road then intersected the woodland, whereas the New Road from Abbey Wood, constructed in 1851, completely divided it into two sections. Of these the larger known as Boarer's wood adjoins the eastern, the smaller or Banks wood the western side of the road. The chief historic features consist of Earthworks, the Cundite Pond, a Well, a Tumulus, and several Dene Holes. With regard to the Earthworks, those extending along the northern border of Boarer's wood where they enclose a portion of the woodland adjoining the homestead pasture, are still distinguishable for a considerable distance though in places not easy to define. Others of more interest form an irregular "three-sided enclosure" surrounded by a ditch on the landward side, in the valley where the pasture and arable lands unite to form a portion of the northern boundary of Boarer's wood. It has been suggested* that these formed part of an entrenchment for the protection of a waterside community against land enemies when the tides flowed up the valleys of the marshland crossing the site of the present road from Abbey Wood to Belvedere, to the pastures adjoining the woodland. Opinions differ as to their origin, however, and as A. L. Leach, F.G.S., has shown† other earthworks may be traced in Banks wood branching off from the path near the Denehole to extend some hundred yards up and down the valley. Further, A. L. Leach considers "there is not the slightest evidence that any are defensive or prehistoric entrenchments," though it has been pointed out‡ that at least one of the chief arguments which he advanced to prove that statement is open to serious question. F. C. Elliston Erwood, who has most kindly furnished me with some useful notes with references on the subject, is of the opinion that the earthworks "are not of any great interest or value." He refers to the plan which he reduced from the original for the "Lesnes Abbey" work previously mentioned, where the woodlands are seen divided into named sections by boundaries, which in the case of one section, "Ashe Hill Coppice," appear to nearly coincide with the so-called entrenchments in Boarer's wood. Also, he considers that the evidence of the map "is very valuable in that it shows an obvious origin for earthworks that at the least are abnormal and therefore suspect." Owing to the courtesy of the Trustees of Christ's Hospital we have been enabled to examine the original plan. This shows the boundaries of "Ashe Hill Coppice" to coincide closely

* V. C. H. Kent. Earthworks, unclassified. Class X. Also Appendix II., and Arch. Jour., Vol. XLII., pp. 269-302.
† Proceed. W.D.A.S., Vol. XVII., pp. 28-35, 64-81.
‡ Proceed. W.D.A.S., Vol. XV., p. 60.

with the existing earthworks on that site. Moreover, part of one of the boundaries of "Old Cheastnut Tree Coppice" appears to correspond approximately with one end of the earthworks in Banks wood. It is clear that the boundaries were occasionally altered, as on another plan * of the estate, dated 1791, it is stated that "Burch Hill" and "Wood Field" Coppices were then united and the old divisional boundary is not shown on that plan. If, as is probable, other similar alterations have been made since 1791, and the old actual boundaries destroyed, it would be clearly impossible for all the existing earthworks to coincide with the sectional boundaries on either plan. Unfortunately, however, no evidence is forthcoming of such changes subsequent to 1791, but an examination of all the existing earthworks in conjunction with both plans leads to the almost irresistible conclusion that in these sectional boundaries we possess the solution of the problem.

Little appears to be known about the "circular† well with stone steining" close to the junction of the path from the farm with that from the gate opening into New Road, perhaps dating from mediæval times, though it may have been connected with the water supply of the Abbey.

The Condyt or Cundite Pond § is of much more importance as shown on the Christ's Hospital plan. This lies a little west of the steep rise near the top of the path leading straight up the hill from the farm and is well described by A. W. Clapham: "The Abbey stands at the foot of a small gully in the hill side, worn by the action of a stream running in winter only; and high up this gully about a quarter of a mile or more above the Convent an earthen dam was built across forming a small triangular reservoir or pond. The dam was probably supplied with sluice gates and the water conveyed to the Convent either through a built sewer or open water course. It is unfortunate that no definite trace of this can be found so that the eventual distribution of the water to the lower conduit and Rere-charter remains unexplained." The writer also quotes "State Papers," Hen. VIII., *ad. seq*: "In 1471, in the Abbot's court one Robert Dove was fined 2d. for 'le schakyng de Chestayntreys at Condytpond,'" a note which is especially interesting as showing that chestnut trees flourished there then, as they do now.

The remains of a Tumulus may be seen on the eastern plateau in Boarer's wood in a direct line about 170 yards almost due north of the Nurseries. This was briefly referred to‡ by F. C. J. Spurrell at a meeting of the Archæological Society at Dartford in 1868, as "one (Tumulus) in Abbey Wood opened and found a Crematory."

* Both plans are to be seen at 27, Tower Street, London.
† "Lesnes Abbey," p. 61.
§ See photograph p. 75.
‡ Arch. Cant., Vol. XVIII., pp. 307-08.

When reopened on April 11th, 1912, by members of the Woolwich District Antiquarian Society only a few fragments of burnt flint and blackened vegetable matter were discovered, nothing, as F. C. Elliston Erwood states,* "that gave the slightest indication of sepulchral origin."

Several indications of Dene Holes now almost choked up with soil, leaves and other vegetable matter, may be observed in Boarer's wood, though the best examples are three situated near the northern boundary of Banks wood, close to Dyall path, one especially being well preserved.

When these three were explored by members of the S.E. Union of Scientific Societies during 1907-8† after the sand, pebbles and vegetable débris which had partially filled them had been cleared away, it was discovered that each shaft terminated in a chalk chamber constructed on the double trefoil pattern. In two instances the length of the shaft is not stated but it appears that the chalk level was highest in the third case (No. 3) where the chamber was reached at less than 30 feet below the surface. Careful examination of the material at the bottom of the shaft and in the chalk chambers revealed numerous bones of domesticated animals including those of a sheep estimated to belong to mediæval times. A knife with horn handle perhaps dating from 1770, the skull of a Pole Cat, fragments of a grindstone, blocks of Kentish Rag, and a specimen of allophane analysed by L. Louis Foucer in 1909 A.D., constituted the most interesting objects discovered. The search, however, afforded no fresh clue as to the origin of such excavations.

Near the south-eastern corner of Banks wood the remnant of a wooden structure may be seen in the boundary fence which, although of comparatively recent date, is not without interest as it represents part of a rustic bridge constructed by the Chillingsworth family between 1863-1891, when resident at Hurst House. This bridge connected the house grounds with the upper part of Banks wood which the family rented and converted into ornamental pleasure grounds. Amongst other improvements an island was constructed in the middle of both the upper and lower pool, the former was planted with rhododendrons surrounding a central pine and the latter fitted with a fountain. In the hollow between the two ponds spanned by rustic bridges, watercress beds and numerous ornamental waterside herbs and shrubs were established. This hollow could be approached from the house grounds by crossing the rustic bridge over Hurst Lane and continuing along a path bordered on either side by rhododendrons leading past the upper pool. Part of this path, the two islands and the pipes of the fountain may still

* Proceed. W.D.A.S., Vol. XVIII., pp. 82-3.
† Proceed. W.D.A.S., Vol. XIV., pp. 50-53.

be seen, though most if not all of the waterside plants were uprooted and the rustic bridges destroyed soon after the family gave up the tenancy. Nevertheless, it is to this ornamental work that we owe the masses of rhododendrons, the few pines, small yews, and a Lombardy poplar, if not the golden saxifrage found in that part of the wood.

Perhaps the earliest reference to flowering plants in connection with the estate is to be found in a small volume* dating from about 1506 A.D., written by a Sub-Prior of the Abbey named William Bayse who was evidently a herbalist as he mentions several plants with healing qualities, in two instances suggesting remedies for specific diseases. As some of these plants still flourish either near the Abbey remains or within the woodland they deserve notice although already commented upon by the late W. H. Griffin.† First we read that "Celyndyn is good to drynk for the jaundy," an obvious reference to the Greater Celandine which still (1924) grows by the Abbey walls. "Culpepper" recommends the juice of this herb as a cure for jaundice and sore eyes, the last probably taken from Pliny who copied it from Aristotle,‡ where the swallow is said to restore the sight of her blinded young by the aid of this plant. Again the receipt for a "medycyn for a hete of an agawe" is: "Take herbs Ive and Dandelion and hertes tunge and brusse them and sethe them in fayr water and with ye same water make you almond mylke." Here the commentator was unfortunately led astray through an erroneous copy which translates "hertes tunge" into "Herte, lunge," instead of consulting the original, and in consequence his remarks have no application to the correct rendering of the passage. It is quite evident that the Hart's tongue is referred to, a fern that then perhaps flourished on the Abbey walls, or in the woodland, once commonly used for medicinal purposes. Other herbs mentioned are sharpburrs, lilly, daffodyll, fumytory, endyvs, and dragen. Of these the first four, as the commentator remarks, probably refer to the Burdock, Lily of the Valley, Daffodil, and Fumitory respectively, of which at least three have been recorded for the woodland. Of the other two, the "Water of Endyvs" may mean a decoction of Cicorium Endivia, a perenniel said to have been introduced first into this country early in the 16th century.** It may, however, refer to the long-established alien C. Intybus, "esteemed good against jaundice," a true endive as the specific name denotes. Lastly, "Dragen" may refer to the "long sheathed Arum or Common Dragen," though perhaps the Snapdragon, also once used for medicinal infusions, is indicated.

* Proceed. W.D.A.S., Vol. XV., p. 126.
† Proceed. W.D.A.S., Vol. XVI., pp. 73-74.
‡ Uses of Brit. Pts., Henslow, p. 13.
** Dict. of Gard. Nich.

GEOLOGY.

In dealing with the geology of the woodland the absence of clear sections compels the greatest reserve, but it is probable that the following strata, in descending order, are represented :—

EOCENE	YPRESIAN cycle of sedimentation.	London Clay.
		Blackheath, Oldhaven (=Sinceny) beds.
	LANDENIAN cycle of sedimentation.	Woolwich Series.
		Thanet Sands.

SECONDARY.

Upper Chalk. Micraster coranguinum zone.

EOCENE.

London Clay. Traces of the extreme base of the London Clay may be expected to occur in the higher parts of the wood from analogy with a recent excavation at "Shornells," which, exposed pebbles in a grey clay matrix, with shells and fish teeth.

Blackheath Beds. These beds which throughout the district rest erosively on the underlying formations are strongly developed. Besides ravining, the beds show pronounced local scooping so that they may cut out any or all of the Woolwich series even through the Thanet sands down to the Chalk.

So far as can be seen from the surface indications these beds comprise such highly porous strata as thick pebble beds in the upper part, with clean, well-washed, pale sands more prevalent towards the base, the whole probably in current-bedded lenticles, with a rich fauna of mixed estuarine and marine deposits. (See Fossils.)

The Woolwich Series. Here more than ever in the absence of suitable sections the following difficulties are encountered. (1) The steep slopes encourage a heavy mask of downwash. (2) Slipping of the Eocene strata—the Woolwich series in particular—is favoured both by the Thames-ward dip and the steep slopes. The possibility of slipping causes great uncertainty as to the Eocene beds being in place.

The Thanet Sands are represented by fine marine sands, greenish grey especially at the base, drying to drab yellow, and remarkably free from pebbles. A layer of green loam with numerous green-coated Bull-head flints forms the base of these sands as seen in section in the Chalky Dell. The green colour is due to glauconite, an iron silicate.

SECONDARY.

Upper Chalk. Excavations have revealed the Chalk in the Chalky Dell where a section § shows the following strata :—

Downwash, mostly loams	4 ft.
Thanet Sand, with occasional thin iron-stained seams	5 ft.
Bull-head beds. Numerous green-coated flint nodules in matrix of green loam, weathering to ferruginous colouring, especially along a one-inch seam at the base ..	10 ins.
Chalk. Soft, white, much-jointed, including five bands of flint nodules ; the fourth band from the top much the strongest	Up to 10 ft.
Chalk talus	Up to 15 ft.

The Chalk has a pronounced northern dip. It has yielded a number of fossils. (See list, p. 70.)

The safest guide to the Eocene beds as represented in the woods is to be seen at the Knee hill section just outside Banks wood where the following strata may be observed :—

Blackheath Beds.	Pebble beds with the base strongly scooping.
Woolwich Series.	Sand with thin clay seams.
	Thin pebble bed.
	Green loams with scattered pebbles in places.
	Basement pebble beds, very ferruginous.
Thanet Sand.	With the upper part much iron stained.

In order to illustrate the sequence of the above mentioned beds a photograph §§ of the well known section at Tuff & Hoar's pit, East Wickham, has been provided. This pit is about half a mile distant from the woodland. The section has been thus described* : —

Blackheath Pebble Beds	Up to 9 ft.
Woolwich Basement green loams with very slight pebble courses	7 ft.
Thanet Sand	66 ft.
Bull-head Beds with (?) Allophane	6 ins. to 1 ft.
Chalk high in M. coranguineum zone ..	8 ft.

The (?) Allophane may be the allied mineral halloysite.

§ See photographs, pp. 77-79.
§§ See p. 81.
* Proceed. Geol. Ass. Vol. XXX., p. 197.

SCENIC FEATURES.

The woods with their abrupt Blackheath spurs and characteristic slades—"deep, steep-sided, square-edged gullies"—clearly form a notable portion of the deeply dissected bold northern front to the Bostall Heath Plateau, from which they cannot on any physiographical grounds be separated, for just as the northern pointing teeth of a comb are merely connecting portions of the complete instrument so these spurs and slades form part of the plateau which has its unbroken main mass rising some 200 ft. O.D., southwards.

RAINFALL.

The readings, as kindly supplied by the Meteorological Office for Crossness, about one-and-a-half miles north-east of the Abbey site, show a mean annual rainfall of 21·407 inches for the fourteen years, 1910-23, though such readings as are available for Bexleyheath, nearly two miles south-east of the Abbey, show a rather higher rainfall. Thus during the three years 1920-22 the rainfall at Bexleyheath averaged 19·05 inches as compared with 16·73 inches for the corresponding period at Crossness, or 2·32 inches more. This comparison is, however, scarcely satisfactory as covering so short a period, but nevertheless it tends to show that the rainfall for the woodland, which for our purpose may be said to lie between the two rainfall stations, exceeds that for Crossness, though clearly falling well below 25 inches (625 mm.) and thus approximating to that for the lowest rainfall areas on the flat eastern coastlands.

Part I.—THE FLORA.

CLASSIFICATION OF PLANTS.

I. PHANEROGAMS (Flowering Plants).

DIVISION A. Angiosperms (seeds enclosed in carpels).

Section I. Dicotyledons.

Section II. Monocotyledons.

DIVISION B. Gymnosperms (seeds not enclosed in carpels).

II. CRYPTOGAMS.

DIVISION A. Pteridophyta (Vascular Cryptogams).

Section. I. Filicales (Ferns).

DIVISION B. Bryophyta (Non-Vascular Cryptogams).

Section I. Musci (Mosses).

Section II. Hepaticæ (Liverworts).

III. THALLOPHYTA.

DIVISION A. Fungi.

,, B. Lichens.

ABBREVIATIONS.

(Used in the Lists.)

c.fr. = cum fructu (with fruit).

E.M.H.—E. M. Holmes.

H.C.N.—H. C. Napier.

W.S. = "Woolwich Surveys."

V.H. = Victoria County History of Kent.

ABBREVIATIONS AND SYMBOLS.

(Used on the Charts.)

Double crosses (++) = Pteris aquilina.

Single cross (+) = Young Acer Pseudo-Platanus.

Single cross with a dot (+.) = Older Acer Pseudo-Platanus.

AC = Acer campestre.

B = Betula alba.

CO = Cratægus Oxyacantha.

CS = Castanea sativa.

Csa = Cornus sanguinea.

Ee = Euonymus europæus.

Fe = Fraxinus excelsior.

Lv = Ligustrum vulgare.

LP = Lonicera Peri-Clymenum.

Pa. = Pyrus aucuparia.

Q = Quercus Robur.

Qs = Quercus sessilis.

Rf = Rubus fruticosus. sp.

Sn = Sambucus nigra.

VC = Veronica Chamædrys.

BOTANICAL SURVEY.

The original Christ's Hospital plan of 1655 shows the woodland divided into nine sections or "Coppice woods," each with the acreage and the number of years growth of the plantation included with the name of the Coppice, though in a few cases the figures are almost illegible. In three instances the name of the tree which flourished there is also included with the name of the Coppice. Thus we find "Burch Hill" of four, "Ashe Hill" of one (?) and "Old Cheastnut Tree Coppice" of six years' growth. In the last a single "old Cheastnut Tree," marked on the southern border, probably represents an ancient landmark. This evidence that the Ash, Birch, and Chestnut covered a considerable acreage in the middle of the 17th century is especially noteworthy in conjunction with the proof already furnished that the Chestnut flourished near the Cundite Pond in 1471, as it tends to show that the growth in some if not in all the Coppices arose from the stools of well-established plantations cut down at intervals. As some of the figures representing the number of years' growth are indecipherable the exact interval is uncertain, though it was probably twelve years as at the present time. The 1791 plan shows that the whole woodland was then coppiced. Apparently the nine sections covering about 224 acres were mostly planted with chestnut, though including at least 30 acres of birch and nearly 24 acres of ash. Since 1791, elms, sycamores and more and more chestnut appear to have been planted to the partial exclusion of the ash; numerous standard birch, oak, ash, elm, and chestnut encouraged for timber, and the Coppices frequently neglected for a number of years. Less than ten years ago a considerable portion had not been coppiced for 25 years, but during the last nine years owing to the demand for pea sticks, hop poles and stakes, practically the whole has been coppiced, though only a few of the more mature standards have been felled. At the present time the woodland extends over some 193 acres, thus showing a decrease of 31 acres since 1791, mostly due to the encroachments already mentioned. Of this area Boarer's wood covers about 153 and Banks wood nearly 40 acres. As the boundaries will be easily recognised by a glance at the attached map it seems unnecessary to define them, though the geological formation requires some explanation.

It will be observed that the southern border of both woods adjoins the extensive Blackheath pebbly plateau embracing Bostall Heath. Part of this plateau, rising some 200 ft. O.D., extends within the woodland in an irregular series of spurs divided by valleys in every stage of formation, the whole gradually falling northwards towards the Thames marshland. Thus in the higher part of the woods Blackheath beds appear at the surface, lower down the Woolwich beds are seen, whilst still lower the pebbles, sands and clays trailing

down the sharp slopes almost completely cover the Thanet Sand. The Chalk, except in excavations, does not appear at the surface. (See Geology.)

It is not easy to estimate how much of the area planted probably long before the 16th, but certainly not later than the 18th century, was originally covered with woodland. With due allowance for planting and coppicing, the present vegetation indicates that an oakwood and an oak-birch-heath association were formerly represented, the latter perhaps derived from the degeneration of the former. Of these the oakwood association probably covered most of the lower ground, where, owing to dry slopes alternating with damp hollows, both a damp and dry oakwood association may have been in evidence. In the higher ground part of the oak-birch-heath association still remains practically unaltered except by coppicing, though it is clear that this association once covered a much more extensive area, as indicated by small isolated patches of Calluna almost destroyed by the shade of planted trees. As any attempt to define exactly the former limits of the two associations might lead to erroneous conclusions the map (Secs. III., VI., IX.-XIV.) only shows how the two merge into one another at the present time.

OAKWOOD ASSOCIATION.

Commencing with the much modified oakwood association where the chestnut has been so extensively planted as to be the dominant of the tree stratum, we find the birch and the pedunculate oak abundant with the sessile or durmast oak an occasional species. The distribution of the hornbeam (C) and ash (Fe) is shown on the map. It will be observed that the former is chiefly confined to the lower ground where pebbles, sands and clays overlie the chalk (Secs. VIII. and IX.), though a few trees affect the pebble beds on the adjoining slopes (Secs. VII. and X.). The latter, still not unfrequent on the site on "Ashe Hill Coppice" (Secs. VII.-VIII.), favours similar soils in the lower damper ground, rarely ascending to the spurs except where shell-beds afford a supply of calcium carbonate with a moist subsoil. It will be noticed that the elm and sycamore usually occur in small societies probably where originally planted (Secs. II.-IV. and VII.), though a few isolated elms may be found as also young sycamores which have sprung up from self-sown seed. Thus it would appear that the pedunculate and sessile oak, with the birch, ash, and hornbeam, represent the original woodland trees, the two latter, however, of local edaphic distribution.

Of the *shrubs or small trees* we find the brambles dominant, though absent from considerable areas; the holly frequent and usually social in the higher ground; the privet, maple, dogwood, elder, hazel and sallow almost confined to the lower ground or shell-beds; the guelder rose, whitethorn and blackthorn (except where

planted in boundary fences) occasional species ; the two buckthorns rare. The mountain ash is probably the most widely distributed subordinate shrub or small tree throughout the association.

Of the *herbs*, the daffodil dominant in the Prevernal gives place to the bluebell dominant in the Vernal, the latter superseded by the bracken dominant in the Aestival and Autumnal aspects.

Of the *mosses*, Tetraphis pellucida, Dicranella heteromalla, Mnium hornum, and Webera nutans represent the co-dominants giving place to Barbula convoluta, Barbula unguiculata and other acrocarpi on the made-up chalky paths and to Hypnum praelongum with various pleurocarpi in the lower ground.

These dominants with their subordinates present five marked seasonal aspects :—

The PREVERNAL (March—Mid-April) distinguished by—
Trees and shrubs in flower—Elm, Hazel, Goat Willow, Aspen, Bullace.
Herbs in flower—Lesser Celandine, Wood Anemone, Moschatel, Barren Strawberry, Dog's Mercury, Daffodil.

The VERNAL (Mid-April—May)—
Trees and shrubs—Leaves appear. Flowers of Crab, Cherry, Hawthorn, Mountain Ash.
Herbs in flower—Jack by the Hedge, Greater Stitchwort, Ground Ivy, Bugle, Ramsons, Bluebell, Cuckoo Pint, Wood Rushes, Melic and Wood Millet Grasses.

The ÆSTIVAL (June—August)—
Trees in flower—Chestnut.
Climbers in flower—Traveller's Joy, Honeysuckle.
Herbs in flower—Dyer's Weed, St. John's Worts, Brambles, Roses, Willow Herbs, Ragworts, Thistles, and Grasses (with an abundance of bracken).

The AUTUMNAL (September—November)—
Climbers in flower—Ivy.
Chiefly distinguished by the abundance of agarics and other fungi.

The HIEMAL (December—February)—
The first leaves of a few early flowering plants—Lesser Celandine, Cuckoo Pint, Daffodil, Bluebell.
Mainly distinguished by the active growth of certain mosses which, especially when massed and covered with mature (c.fr.) or immature (i.fr.) fruit, appear all the more conspicuous owing to the almost total absence of any but evergreen foliage. These mosses are :—

Catharinea undulata (c.fr.).
Ceratodon purpureus (i.fr.).
Dicranella heteromalla (c.fr.).
Fissidens bryoides (c.fr.).
Barbula convoluta (i.fr.).
,, unguiculata (i.fr.).
Mnium hornum (i.fr.).
,, rostratum (i.fr.).
Brachythecium velutinum (c.fr.).
,, rutabulum (c.fr.).
Amblystegium serpens (i.fr.).

The *annuals* represent less than 23 per cent. of the flowering plants in this association, and most of these are invaders which are only able to enter because of constant human interference, the majority being perennials with a comparatively few biennials. Owing to coppicing, as also to the numerous pathways (some wide enough to permit the carting of timber) hedgerow, cultivated and waste ground annuals are not unfrequent. Of these a few, usually confined to the two latter habitats, have scarcely been noted except on a small patch of ground some ten yards square adjoining the orchard wall (Sec. IV.) formerly cultivated by a man employed to look after the woods, but now totally neglected. On this patch the following have occurred more or less frequently :—

Capsella Bursa-pastoris,
Lepidium ruderale,
Viola tricolor,
Senecio vulgaris,
Euphorbia Helioscopia,
,, exigua,
Mercurialis annua,
Urtica urens.

Others such as

Brassica arvensis,
Matricaria inodora,
Solanum nigrum.

together with two ruderal aliens Sisymbrium altissimum and Cannabis sativa are found occasionally. Another alien, Erigeron canadensis, appears yearly, presumably from self-sown seed, but without any noticeable increase. Ubiquitous species such as Stellaria media and Poa annua appear regularly. Of the total recorded the following are perhaps most frequently associated with woodland :

Corydalis claviculata,
Arenaria trinervia,
Myosotis scorpioides,
Lactuca muralis.

Of the *biennials* Melilotus officinalis, M. alba and Echium vulgare, not unfrequent on the farm lands, appear to be occasionally introduced in horse fodder or by some similar means. Such species, though they fruit freely, have not been observed to produce seedlings. The Hemlock commonly produces sufficient seedlings to replace the dead stock though without showing any increase.

Of the *perennials* the majority of the trees and shrubs are able to withstand coppicing though the hawthorn, holly, and rose do not readily form stools. A few of the hawthorns, however, and most of the hollies are usually spared by the axemen. Many of the younger brambles escape practically undamaged when the coppice

is cleared, others quickly spread from the adjoining uncut woodland, whilst still others arise from self-sown or bird-distributed seed, so that under favourable conditions a considerable area may be covered by various *Rubi* within two or three years. In addition to those that fall naturally, numerous seeds of brambles, hawthorn, holly and mountain ash occur in the droppings of birds chiefly of the thrush kind, though the jay is probably mostly responsible for the small heaps of seeds of the euonymus and elder frequently noted after much of the more soluble excrement has disappeared. The jay also is at least partly responsible for the distribution of the "seeds" of the chestnut, as it has been frequently observed to transport the nuts from place to place in the woods as also to the adjacent arable land where,when alarmed, the "seed" is abandoned. The rook represents the most useful and active agent in thedistribution of acorns, though here again the jay is helpful. Such birds as the pigeon and pheasant swallow acorns eagerly, though they scarcely assist as much in their distribution as the squirrel. Rooks, after thieving walnuts from the homestead trees, may occasionally drop one in the woodland, though the only walnut tree within the association clearly originates from the fallen fruit of a tree just outside the boundary. In spite of the winged "seeds" of the sycamore isolated trees are scarce, though seedlings appear in abundance around the parent plants. Seedlings of the chestnut are scarce, of the oak more common, of the mountain ash and holly occasional, and of the hawthorn rare. On the other hand seedlings of the birch appear throughout the association, though apparently showing a preference for moist banks near paths shaded by chestnut where such mosses as Mnium hornum and Dicranella heteromalla are frequent. It is noticeable that on such banks Scleroderma vulgare (=aurantium Pers.), said to form mycorrhiza* on the silver birch, is abundant, so that as the fungus-root is plentiful on such seedlings some relation between the two seems at least probable. During certain years notably 1923—although the mountain ash produces an abundance of fruit, only a comparatively few berries escape the attack of the fungus Oidium Cratægi, so that apart from injury by the fungus the shrivelled berries offer little inducement for bird carriage. Naturally innumerable "seeds" of the various trees and shrubs above mentioned are destroyed by squirrels, mice and smaller creatures, though even these assist in their distribution. Nevertheless, of the number that escape all pests probably only a comparatively few reach a suitable nidus.

Of the perennial herbs such rhizomatous, bulbous, tuberous or creeping early flowering species as the wood anemone, lesser celandine, moschatel, ramsons, dog's mercury, ground ivy, daffodil and

* "Fungus-Root" (Peyronel quoted), by R. Paulson, F.L.S., Essex Nat., Vol. XX., Part iv., p. 182.

bluebell, precede the deep shade in chestnut coppices, where later flowering plants are unable to flourish, besides suffering little if at all when the coppice is cleared. Even these early flowering plants are scarce on the dry steeper slopes below thickly planted chestnuts, where practically only a few etiolated brambles manage to exist together with such mosses as Tetraphis pellucida, Dicranella heteromalla and Leucobryum glaucum, which grow on the living or decaying stools. Moreover, even where more light filters through, the thick layer of chestnut leaves which frequently remains unrotted until August or even later, offers no opportunity for even ground mosses to establish themselves, so that it is only on wind-swept patches where the soil is more or less exposed that Dicranella heteromalla, Leucobryum glaucum, Webera nutans and Mnium hornum can obtain a foothold.

Given similar conditions as to the number of years growth, soil, and subsoil, many more perennial herbs occur below the comparatively slight shade of birch than under chestnut. Of these perennials the majority suffer little appreciable injury during or after coppicing with the result that more herbs are established on and ready to spread over birch than over chestnut clearings during the ensuing summer. In addition it would appear that birch clearings attract a greater variety of sun-loving colonists than chestnut clearings, probably because of the excessive covering of "litter" on the latter. Thus at the end of the first summer after coppicing vegetation is usually more abundant amongst the stools of the birch than the chestnut. In the lower ground, where either chestnut, birch, or mixed wood clearings adjoin one or more paths, certain herbs quickly spread from the side of the path or paths, in some cases covering a considerable area during the first two years after coppicing. This is especially the case where Holcus mollis is plentiful on and beside the pathways, as apart from seed this grass spreads rapidly by its creeping rootstock to form closely aggregated tufts which so effectually suppress other herbs that even the bluebell and daffodil deteriorate where a carpet of this perennial becomes once thoroughly established. It is possible, however, that the roots of this grass contain some toxic property inimical to other herbs. The map (Secs. XIV.-XV.) illustrates a herb stratum society with Holcus mollis the dominant, on the lower part of the chestnut-clad slopes on either side of Hatters Bottom path, coppiced during the winter of 1922-3. On some of the clearings such innumerable fox-gloves appear as to suggest their origin from seed that has lain dormant for a number of years, perhaps since the former coppicing, especially as it has been shown* that the seeds of a number of wild plants may retain their vitality after a burial of from twenty to forty years.

* Jour. of Bot., Vol LXII., pp. 50-52.

The common nettle (Urtica dioica) increases rapidly both by seed and underground runners. This nitrophilous plant although unable to withstand successfully so deep a shade cast by trees and shrubs as the dog's mercury, flourishes in half-shaded situations where decaying sticks, branches and other vegetation reduce the evaporation from the soil and thus promote nitrification.* Though not unfrequently associated with Mercurialis perennis, Stachys sylvatica, Lamium Galeobdolon and other herbs, the nettle often forms small, almost pure, well-defined societies in the damper hollows, but it flourishes equally as well amid decaying brushwood on the larger shell-beds. A luxuriant growth of Urtica dioica mixed with a few plants of Stachys sylvatica, Heracleum Sphondylium and Anthriscus sylvestris, now (July, 1924) covers the once cultivated piece of ground near the wall. (Sec. IV.) where decaying brushwood is abundant.

The distribution of Juncus conglomeratus frequently associated with the var. effusus is shown (J.) on the map. It will be observed (Secs. II.-III.) that these rushes follow the tiny Black Pond stream, a mere trickle of water more or less contaminated with drainage from the houses near the western corner of Hurst Lane. Elsewhere in Banks wood these *Junci* are practically restricted to the pools, damp hollows and the sides of the path leading from Pine Pool to the Small Gate. In Boarer's wood both the species and variety are almost confined to similar situations though more plentiful in the lower ground where it is probable that underlying clays retain sufficient moisture to meet the demands of these plants.

The vegetation bordering the pathways in the lower ground usually includes numerous hedgerow herbs such as Lychnis dioica, Stellaria Holostea, Hypericum perforatum, Geum urbanum, Anthriscus sylvestris, Heracleum Sphondylium, Lapsana communis, Ballota nigra, in addition to Holcus lanatus, Arrhenatherum elatius, Bromus sterilis, Bromus ramosus, Agropyron repens, Hordeum murinum, and other grasses. Amid these the climbers and twiners, Galium Mollugo, Galium Aparine, Polygonum Convolvulus, Vicia sepium, Bryonia dioica, and Solanum Dulcamara are frequent. Near the edge of made-up paths as for instance the Farm path (Secs. IV. and V.) constructed or repaired with ragstone, mortar and other material from the Abbey ruins, as also near the Chalky path (Secs. VII.-XII.), a few herbs with some preference for calcareous soils occur. Thus at the edge of both paths Reseda Luteola, Verbascum Thapsus, and Centaurium umbellatum occasionally appear with odd plants of Inula squarrosa and Echium vulgare almost confined to the

* Ecol. of U. dioica by Carston Olsen, Jour. of Ecol., Vol. IX., No. 1.

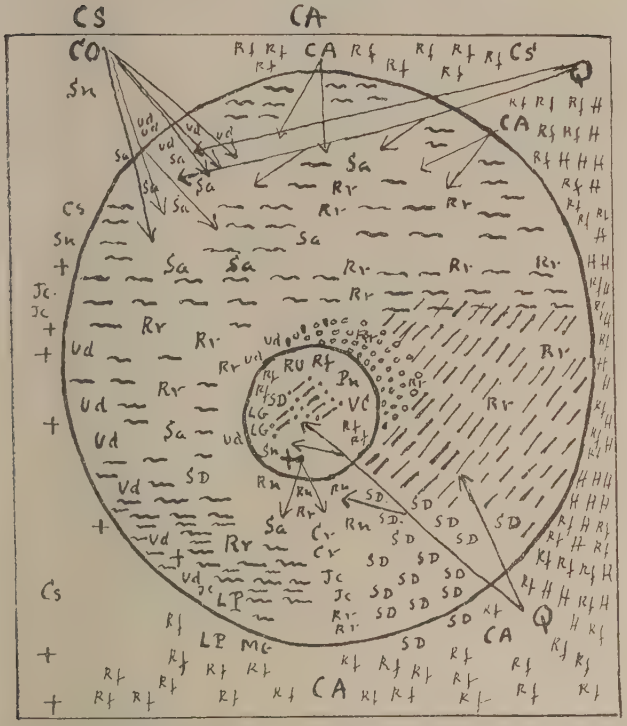
latter path or the Chalky Dell. On such paths the mosses Barbula convoluta and Barbula unguiculata are usually the co-dominants.

In Banks wood the pools separated by damp hollows (Sec. III.) are not without ecological interest. From the ornamental Pine pool § surrounded by hollies, oaks, willows and rhododendrons, a short ditch carries the overflow to the hollow below, partially shaded by several large oaks and chestnuts with here and there a sycamore, elder, hazel or guelder rose. A considerable change has taken place in the vegetation in this hollow since the connecting ditch was cleared out four years ago. Since then, probably owing to the increased water supply, Mentha aquatica has gained ground at the expense of Ranunculus repens and Urtica dioica, formerly the co-dominants, and many more plants of Scrophularia aquatica have appeared. A similar though more remarkable change has taken place where the hollow ends in the densely shaded Fountain pool. Five years ago that pool was almost completely dried up except after a heavy rainfall, though it supported a few patches of Callitriche, odd plants of Ranunculus repens, R. sceleratus, Mentha aquatica, Urtica dioica, Alisma Plantago with the moss Physcomitrium pyriforme growing on the mud. During recent years M. aquatica has gradually increased, the annual R. sceleratus with A. Plantago has entirely disappeared and R. Flammula, perhaps introduced by wild duck or other waterfowl, has become established to form a small colony. A few plants of S. aquatica together with other species referred to in the attached Chart (No. I.) have also appeared. In this case the deep shade perhaps assisted by the increased water supply has proved detrimental to the nettle now represented by a few small plants practically confined to the edge of the pool or the island. Under the shade of the hawthorn (CO) overshadowed by the oak (Q) both the nettle and water mint showed much etiolation. It will be noted that S. Dulcamara has formed a community spreading from the drier edge of the pool almost to the island; also that Callitriche is now confined to a small colony.

Near the base of the embankment of Fountain pool a small iron pipe conveys the sparse drainage to the next hollow terminating in a cup-shaped dell with the small Willow pool at the lower end. The higher part of this hollow overgrown with oak, birch, hazel, maple, mountain ash and brambles, supports a few herbs such as Ranunculus repens, Chrysosplenium oppositifolium, Urtica dioica, Juncus conglomeratus, Carex remota, Carex sylvatica, Milium effusum, with the mosses Fissidens bryoides, Mnium hornum, Plagiothecium denticulatum, and the liverworts Riccia glauca, Lophocolea heterophylla. In the drier part of the dell shaded by

§ See photograph, p. 73.

CHART I. Fountain Pool (Sec. III.).
Scale: 1 inch to 10 yards. June, 1924.


CS
CA
CO
CA
CA
CS
CA
CA
CA

oak, ash, birch, dogwood, guelder rose and elder, the dog's mercury becomes the dominant herb with Chrysosplenium oppositifolium, Circæa lutetiana, Urtica dioica, Rumex nemorosus, Milium effusum, Poa trivialis, P. nemoralis the chief subordinates. In and around the shallow pool partly shaded by willows, Stellaria uliginosa, Galium palustre, Polygonum Hydropiper, Juncus conglomeratus, Carex Pseudo-cyperus, with the bryophytes Mnium undulatum, Hypnum riparium, Chiloscyphus pallescens are not unfrequent. The hepatic, which fruited freely last May (1924), has increased remarkably since 1922.

Two small communities where the sycamore is the dominant tree occur in Banks wood, one adjoining Old Cheastnut Tree path (Sec. III.), the other in a damp hollow which occasionally is slightly flooded by the overflow from Black Pond Stream (Sec. III.). Where these trees are crowded the dense canopy effectually precludes all undergrowth except a few brambles with early flowering and shade-loving herbs, though as the trees thin out more undergrowth appears. Chart No. II. represents the vegetation as seen at the end of May (1924) in the damp hollow shaded mostly by young sycamores (+), again in part overshadowed by a number of older sycamores (+.) with a few large oak (Q), and chestnut (Cs) intermingled. The chart shows a herb stratum society of Urtica dioica mixed with Lamium Galeobdolon occupying towards the centre the damper and least shaded portion of the area with two small societies, one of Mercurialis perennis and the other of Circæa lutetiana, established under the denser shade of several large oaks and sycamores. It will be observed that on both sides the sycamore society

CHART II. (Sec. III.).

Scale: 1 inch to 5 yards. May, 1924.

Illustrating the herbaceous undergrowth of a sycamore community.

Shading:—

Diag. lines and dots = a society of Circæa lutetiana.

Horiz. lines = a society of Lamium Galeobdolon mixed with Urtica dioica

Vert. lines = a society of Mercurialis perennis.

An = Anemone nemorosa.

D = Digitalis purpurea.

Ea = Epilobium augustifolium.

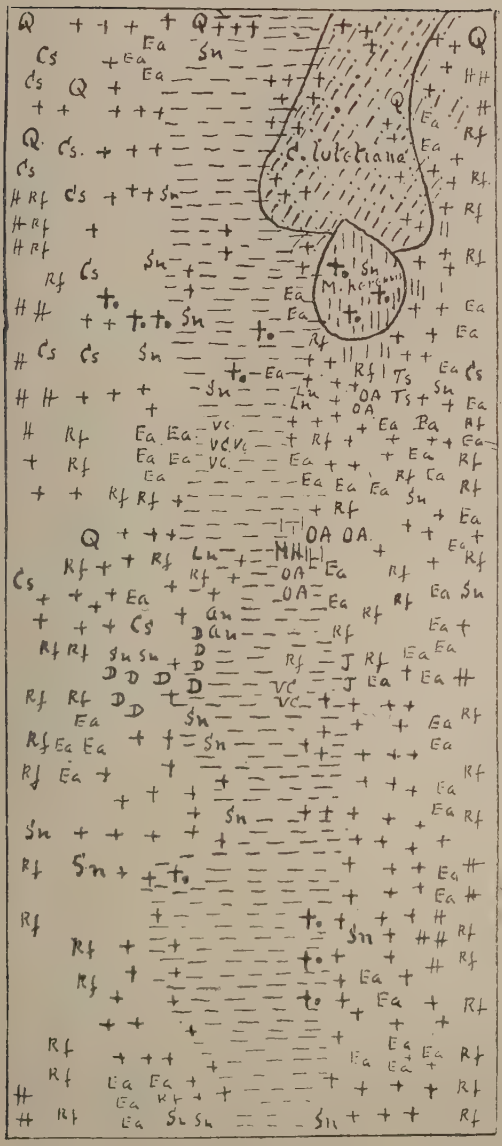
Ln = Lysimachia nemorum.

OA = Oxalis Acetosella.

Ts = Teucrium scorodonia.

For the signification of the rest of the symbols see list of abbreviations.

CHART II. (SEC. III.).



gradually merges with the ordinary woodland where an undergrowth of bracken and brambles is in evidence.

Of the two Blackheath shell-beds that occur in Banks wood the smaller can scarcely be traced except in the fence on the higher ground on the eastern boundary (Sec. VI.) where a young ash, a few elders and an abundance of privet are noticeable. A scanty layer consisting chiefly of fragments of Ostrea scattered over the edge of the spur adjoining Shell-bed path (Sec. II.) distinguishes the larger bed, where numerous ash, and elm, with odd plants of euonymus, elder, an abundance of Allium ursinum, and the almost total absence of bracken are observable.

Several Blackheath shell-beds may also be traced in Boarers wood, all presenting a flora quite distinct from that of the surrounding woodland. Thus the shell-bed on either side of Ashe Hill Path (Secs. VII.-VIII.) is marked by the presence of numerous ash, elder, euonymus, dogwood, odd buckthorns, and an abundance of privet. This is perhaps more noticeable on the western side of the path (shaded portion) where the fragments of Ostrea and Cyrena are more in evidence. Chart III. shows a transect line running in a south-westerly direction through that portion; on this only the trees, shrubs and bracken are noted. After this area was coppiced during the winter of 1920-21 innumerable plants of Jack-by-the-Hedge (Sisymbrium Alliaria) appeared near the southern corner forming a well-defined community extending over about twenty square yards. In 1923 this community gave place to a luxuriant crop of nettles (Urtica dioica) which now (1924) covers a much larger area. On both sides of the path the bracken encroaches on the shell-bed though more plentiful around the margins. An abundance of the moss Mnium affine, observed nowhere else in the woodland, together with Weisia viridula, only sparsely found on similar beds or in chalky places, may also be noted. The former has never been observed to fruit though the latter produces numerous capsules annually.

CHART III. (Sec. VIII.).

Scale: 1 inch to 10 yards.

Transect line running in a south-westerly direction through a section on a Blackheath shell-bed showing the trees, shrubs and bracken. The line between A and B represents the limits of the shell bed so far as can be seen on the surface. The extension of that line beyond A and B illustrates the transition to the ordinary woodland.

For the signification of the symbols see list of abbreviations.

CHART III. (SEC. VIII.).

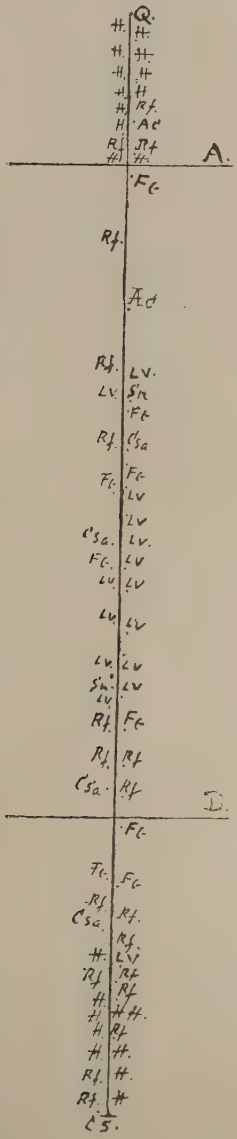
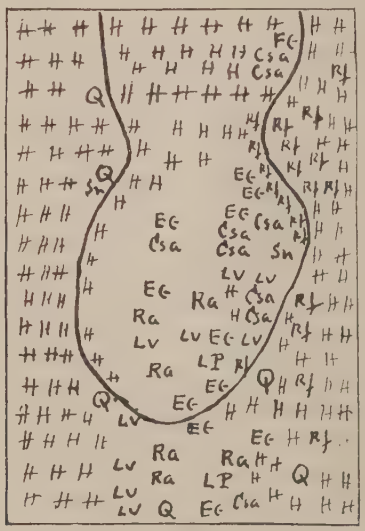


Chart No. IV. shows the distribution of the trees and shrubs on a small Ostrea bed at an altitude of 135 O.D. (Sec. X.). Here again the privet, dogwood and euonymus proved the dominant shrubs with the addition of a few plants of the Butcher's Broom, scarcely found elsewhere in the woodland. The double crosses represent the bracken which was most abundant around the margins.

CHART IV. (Sec. X.).

Scale: 1 inch to 10 yards. May, 1924.



Illustrating the trees, shrubs and bracken of a society on a Blackheath shell-bed. The irregular outline encloses all of the shell-bed to be seen on the surface.

Ra=Ruscus aculeatus.

For the signification of the rest of the symbols see list of abbreviations.

On this small isolated bed the following herbs not noted in the immediately bracken-clad surrounding woodland occurred :—

Arenaria trinervia, Geranium Robertianum, Bryonia dioica, Tussilago Farfara, Arctium Lappa, Taraxacum vulgare, Scrophularia nodosa, Veronica Chamædrys, Nepeta hederacea, Teucrium

Scorodonia, Polygonum Convolvulus, Polygonum dumetorum, Euphorbia amygdaloides, Mercurialis perennis, Urtica dioica, Scilla non-scripta, Milium effusum, Melica uniflora, Poa trivialis, P. nemoralis, P. annua. Of these N. hederacea, M. perennis and Urtica dioica were the co-dominants during the Vernal aspect, with small patches of Milium effusum here and there on the lower western side. Only a few mosses such as Mnium hornum and Webera nutans were observed.

Chart No.V.* shows a diagonal transect line running in a south-westerly direction across another Blackheath oyster bed extending over about forty by twenty yards on the edge of a spur (Sec. X.) at an altitude of 140 ft. Here again the ash is well represented with the privet and euonymus the co-dominant shrubs. In this case the bracken, though more plentiful along the margin of the bed, extends to the centre. Only the mosses Tetraphis pellucida, Leucobryum glaucum, Webera nutans, Mnium hornum and Hypnum cupressiforme appear to occur on this bed, most of them sparsely.

Chart No.VI.† shows the distribution of the trees and shrubs of a plant society on a Blackheath shell-bed where fragments of Ostrea lie scattered over considerably less than thirty square yards of the surface of a spur (Sec. XIII.) at an altitude of 120 ft. O.D. Here again the ash (Fe) with the privet (Lv), euonymus (Eu) and dog-wood (Csa) are well represented. It will be observed that the bracken (double crosses) is practically confined to the edges of the shell-bed. It is probable that neither the privet, euonymus, or cherry (PC) occur elsewhere within 100 yards or more of the shell-bed though all these of course produce fruit specially adapted for bird distribution. The following herbs not found in the immediately surrounding woodland occupied the more central least shaded portion of the shell-beds (lines and dots shading)—Ranunculus bulbosus, Lychnis alba, Arenaria trinervia, Adoxa Moschatellina, Senecio Jacobæa, Cirsium arvense, Hypochæris radicata, Taraxacum vulgare, Myosotis scorpioides, Verbascum Thapsus, Verbascum Lychnitis var. album, Veronica Chamædrys, Urtica dioica, Poa trivialis, Lolium perenne. In the more shaded portions a few herbs including Polygonum Convolvulus, Euphorbia amygdaloides, Bryonia dioica, Luzula pilosa, Deschampsia flexuosa, mingled with the co-dominants Nepeta hederacea, and Mercurialis perennis. Of the mosses, Brachythecium velutinum was abundant with Catharinea undulata, Dicranella heteromalla, Ceratodon purpureus, Weisia viridula, Bryum capillare, Bryum cæspiticium, Bryum argenteum, Mnium hornum mostly well represented.

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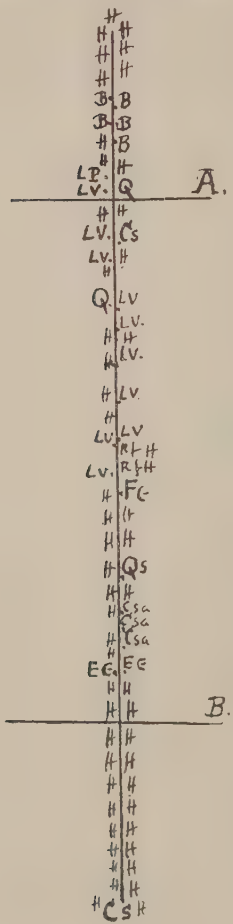
* See p. 18.
† See p. 19.

CHART V. (Sec. X.)

Scale: 1 inch to 10 yards.



Transect line running in a south-westerly direction through a society on a Blackheath shell-bed showing the trees, shrubs and bracken. The line between A and B represents the limits of the shell-bed so far as it is in evidence on the surface. The extension of the line beyond A and B shows the transition to the ordinary woodland.

For the signification of the symbols see list of abbreviations.

A comparison of the tree and shrub flora of the six shell-beds shows that the ash is common to all, the privet abundant on five, the euonymus, dogwood and elder frequent on most, the buckthorn and butcher's broom each represented on one shell-bed only. Where any of these trees or shrubs occur elsewhere in the association they are usually more frequent in the lower damper ground. The privet, however, occurs sparsely in the higher boundary fences though much more plentifully by the chalky path or just outside the dell. In one case (Chart VI.) the broom, a calcifuge, rarely found in the oakwood association, approaches the edge of the bed. Of the herbs

CHART VI. (Sec. XIII.).
Scale: 1 inch to 10 yards.

Illustrating the trees, shrubs and bracken of a society on a Blackheath shell-bed. The irregular outline encloses all of the shell-bed to be seen on the surface.

Horiz. lines and dots = the least shaded herb covered portion.

C = Cytisus scoparius.

PC = Prunus Cerasus.

PM = Pyrus Malus.

For the signification of the rest of the symbols see list of abbreviations.

and mosses recorded for the shell-beds the majority are most commonly met with in the lower ground, the mulleins and Weisia viridula favouring chalky places. The calcifuge bracken, even when abundant all around invariably thins out towards the middle of the beds and in two cases is almost entirely absent. It would be unsafe to generalise from the result of these few observations, but it would appear that the distinct flora of these beds is mainly due to the damp soil and subsoil assisted by the supply of calcium carbonate yielded by the decaying shells. This supply would appear to be sufficient to encourage the growth of the ash, buckthorn, privet, mulleins, and the moss Weisia viridula, whilst at the same time proving more or less detrimental to the increase of the bracken. Where—as in Sec. VIII.—in addition to scattered shells on and near the surface one or more layers of shells exist at a depth of a few feet below, the extra supply of calcium carbonate would be available to the longer rooted trees and shrubs though the herbs and mosses would receive no benefit from that source. Thus we may account for the more marked tree and shrub flora on most of the shell-beds.

A short shaded pathway branching off from the lower end of Pebbly path leads to the Chalky Dell (Sec. VIII.) where a considerable amount of the chalk used in the construction of Abbey Wood New Road (1851) was obtained. The dell consists of a more or less tongue-shaped hollow with a path—probably formerly used as a road—some eighty-five yards in length skirting the base of its eastern slope. On the western side of the pathway, near the entrance to the dell, an irregular oval-shaped pit, some thirty-five yards in length, has been sunk through the first floor to a depth of more than six yards below the level of the pathway. The rest of the floor consists of irregularly shaped mounds alternating with small hollows and more level patches. This dell is of exceptional interest in that it provides near the south-western corner the only notable geological section within the woodland. (See Geology.)

Except on those slopes where pebbles, sands and vegetable debris which have either slipped or been washed down from the upper beds have covered most of the chalk, nearly the whole surface of the dell is strewn with chalk, half-buried by sand, humus, and an abundance of brushwood thrown aside after the dell was coppiced early in March, 1920. Previously to coppicing, the greater part of the dell was so deeply shaded by several large elms and ashes in addition to smaller trees and shrubs that apart from shade-loving species such as the dog's mercury, wall lettuce, enchanter's nightshade and ground ivy, few herbs were in evidence. Near the pathway, however, and on the less shaded slopes several species of Hypericum, with the figwort (S. nodosa), yellow mullein and a few grasses, flourished more or less abundantly. During coppicing almost all the large trees were felled, with the result that many fresh sun-loving

forms appeared during that and the following years. Several mosses and one or two liverworts also appeared. In addition the increase of the mosses Barbula unguiculata, B. convoluta and Barbula rubella, on the pathway, was especially noticeable. The loss of shade had apparently little adverse affect on the established shade-loving herbs. On the contrary, the abundance of decaying brushwood appears to have encouraged the increase of the nitrophilous dog's mercury, now much more plentiful than before coppicing. At the present date (July, 1924) a distinct associes is represented in this dell with the ash and elm the co-dominants of the tree stratum and the oak, chestnut and hornbeam, subordinates. Of these three subordinates the oak is confined to the outermost edge of the dell, the chestnut and hornbeam almost to the sandy slopes. Of the smaller trees and shrubs the elder is dominant with the maple, hazel, dogwood, privet, guelder rose, and brambles subordinates. The privet, though abundant near the south-eastern edge, just outside the dell, only occurs sparsely within. Of the herbs the dog's mercury and stinging nettle are the co-dominants, the latter forming a pure society gradually merging with the former to cover the more southern slope of the thickly brushwood-strewn pit. The bracken only occurs sparingly on the sand-covered slopes. Since coppicing the following herbs, mosses and liverworts not previously observed in the dell have been noted :—

Herbs.—Fragaria vesca, Epilobium angustifolium, E. hirsutum, Heracleum Sphondylium, Dipsacus fullonum, Bellis perennis, Inula squarrosa, Senecio Jacobæa, S. erucifolius, Cirsium arvense, Lapsana communis, Picris echioides, Lactuca virosa, Sonchus asper, Atropa Belladonna, Prunella vulgaris, Listera ovata, Narcissus Pseudo-Narcissus, Holcus mollis, Lolium perenne.

Mosses.—Dicranella varia, Phascum cuspidatum, Pottia minutula, Tortula ambigua, Barbula tophacea.

Liverworts.—Marchantia polymorpha, Lophozia bicrenata.

Of the herbs perhaps the most remarkable is Epilobium hirsutum, which flowered during the summer of 1923. This, with A. Belladonna first observed by Lady Davy at the Grass Foray in 1921, constituted a first record for the woodland.

Of the mosses and liverworts only P. cuspidatum, P. minutula and Lophozia bicrenata have been noted elsewhere in the association.

Altogether over thirty mosses and ten liverworts have been recorded for this dell.

OAK-BIRCH-HEATH ASSOCIATION.

It is clear that at one time this association covered all the higher part of both woods, including the area now constituting the Lessness

and Utrect estates, together with the rest of the extensive Blackheath pebbly plateau of which Bostall Heath forms a part, though it is now scarcely represented except on that heath and within the woodland. As, however, the exact former limits of the association within the woodland are now not easily defined, it will probably prove more satisfactory to deal only with the Calluna-clad portions now extant. A glance at the map (Secs. III., VI., IX.-XIV.) will show that the association is much more representative in Boarer's than in Banks wood, so that it may be advisable to deal with the portion in the former wood first.

In Boarer's wood, except for the planting of chestnut chiefly confined to the lower end of the spurs, slight coppicing and peat collecting, the association has remained practically undisturbed over a considerable area. Here the sessile form of the oak replaces the pedunculate form, though the latter occurs occasionally, usually not far from where the two associations merge into one another. Here also the birch, though scarcer under the stunted oak, is abundant in the more open situations, with the heather (Calluna) usually plentiful except where destroyed by peat cutters. Of the smaller trees and shrubs the mountain ash is frequent, the crab, broom and bramble occasional, and the Service Tree (Pyrus torminalis) rare. Of the herbs, the bracken is dominant with Deschampsia flexuosa the most widely distributed subordinate. Other subordinates characteristic of or frequently found on such heaths, as for instance Galium hercynicum and Teucrium scorodonia, are sparsely represented ; Festuca ovina and Aira præcox more plentifully.

The remainder of the subordinates are represented by odd plants of Cerastium semidecandrum and Taraxacum lacistophyllum together with numerous species mostly frequent in the oakwood association, including several ruderals and weeds of cultivation, evidently escapes from the nurseries. Only a few mosses flourish on this portion, where Webera nutans is dominant, with Tetraphis pellucida, Ceratodon purpureus, Campylopus pyriformis and Leucobryum glaucum, the principal subordinates.

Formerly the oak-birch-heath association in Banks wood not only covered the higher ground but probably extended along some of the ridges considerably below Pine pool. As already mentioned this part of the wood was once (1863-91) used as an ornamental pleasure ground ; but it is clear that a long time before that period the whole area had been planted, chiefly with chestnut, and coppiced at intervals with the rest of the woodland. In consequence of this planting and coppicing, together with the introduction of pines, sycamores and masses of rhododendrons, the greater part of the association has disappeared or become so modified as to be scarcely recognisable except in the least shaded areas in and around the gravel

pit and near the Rustic bridge path (Secs. III. and VI.). Over these small areas, in addition to the oak, birch, and heath, the mountain ash, bracken and Deschampsia flexuosa are all more or less represented, with Webera nutans, the dominant moss.

In the small gravel pit such heath forms as Cytisus scoparius, Teucrium Scorodonia, Polytrichum juniperinum, Polytrichum piliferum, and Dicranum scoparium also occur. This pit is no longer worked, but stones, gravel and other material to be used in the repair of the adjacent roads are occasionally deposited in it during the winter months, with the result that over the greater part of the pit the heath forms have disappeared, to be replaced by weeds of cultivation, ruderals, casuals, hedgerow and other species. This pit has furnished the following herbs and bryophytes not represented elsewhere in the association :—

HERBS.—Sisymbrium Thaliana, Erophila verna, Spergularia rubra, Ornithopus perpusillus, Potentilla argentea, Alchemilla arvensis, Erigeron canadensis.

BRYOPHYTES.—Polytrichum piliferum, Lophozia ventricosa, Gymnocolea inflata.

The combined portions of the oak-birch-heath association have only yielded a few flowering plants and bryophytes not recorded for the oakwood association. These are :—

FLOWERING PLANTS.—Cerastium semidecandrum, Spergularia rubra, Pyrus torminalis, Galium hercynicum, Potentilla argentea, Taraxacum lacistophyllum, Hieracium murorum.

BRYOPHYTES.—Polytrichum piliferum, Gymnocolea inflata.

FLOWERING PLANTS.

1918-24.

The earliest available records appear in a number of lists compiled by the late H. C. Napier in 1911-12, kindly supplied by C. H. Grinling, B.A. These include separate lists for the "woodland," "farmlands," "pond by the farm," "Abbey walls," "about the excavations," and a summary of 205 species observed in one day when conducting a Nature Study party over the combined areas. It is clear that the summary includes a large number of obviously woodland plants not recorded in the wood lists, but as the latter lists probably contain the more important species and as any rearrangement of the summary would invite erroneous conclusions we propose to deal with the plants listed for the woods alone. Of these, Hypericum montanum, then considered rare, is now very scarce, though Potentilla argentea recorded for the gravel pit in Banks wood is still plentiful in that station. Three species do not appear to have been observed in the woods since, viz.:

Coronopus procumbens,
Lysimachia Nummularia,
Filago germanica,

all listed for the "valley where the chalk crops out," clearly in or near, the chalky dell in Boarer's wood. In addition it is of interest to note that two plants of the "Golden Dock" were found in the chalky hollow, "a water plant there many hundred yards from water," evidently Rumex maritimus also recorded in the "pond list." Hemlock, seven feet high, Galium palustre, Allium ursinum and Listera ovata, all appear to have been noted in the same stations where they now flourish. Dyer's Greenweed "in the chalky hollow" probably refers to Dyer's weed (R. Luteola) usually plentiful in that station. Under "plants which should be found in the woods," the following are mentioned:

Chrysosplenium oppositifolium,
Filago minima,
Convallaria majalis,
Senecio viscosus.

Of these, the first is fairly plentiful in Banks wood, the last rather rare, the others have not been noted. There is an old record,* however, for the Lily of the Valley "at the West end of Abbey Wood, 1893." The summary includes twenty-eight grasses, four rushes and one sedge—chiefly common species. The most interesting, from our point of view, are Bromus arvensis and Poa rigida, both more likely to have been found outside than within the woods.

* Proceed. W.D.A.S., Vol. XVI., p. 74.

On April 28th, 1918, several members of the Dartford Field Club spent the afternoon in the woods, but although numerous flowering plants and cryptogams were listed, no fresh records were established.

On July 9th, 1921, a Grass Foray under the leadership of W. R. Sherrin, A.L.S., yielded thirty-three grasses and eight rushes and sedges, including five not previously noted in the woods :—

Agrostis canina L.,
„ tenuis var. nigra Dr.,
Agropyron repens var. Leersianum Gray,
Luzula multiflorum Lej.,
Carex divulsa Stokes.

Since that Foray, only three grasses, Poa pratensis var. angustifolia L. collected by C. H. Grinling, 1922, Bromus hordeaceus var. glabratus Dr., and Aira præcox L. have been added.

A curious form* of Sagina apetala L., eglandular, with pedicels shorter than the calyx, flowers nearly sessile, sepals blunt, occurs in the woods.

I am grateful to G. C. Druce, F.L.S., and W. R. Sherrin, A.L.S., for their kind assistance in the determination of several of the more critical varieties. W. Watson, of Bickley, has most kindly made himself responsible for the brambles.

Nomenclature. Botanists' Pocket Book. Hayward's. Revised by G. C. Druce, M.A. 17th Edition. Published by Bell & Sons, Ltd., York House, Portugal Street, W.C.2. 1922.

Rubi. Manual of British Botany. By C. C. Babington, M.A. Edited by A. J. Wilmott, B.A. 10th Edition. Published by Gurney & Jackson, 33, Paternoster Row, E.C. 1922.

PHANEROGAMS.

FLOWERING PLANTS.
(328 species.)

DIV. A.—ANGIOSPERMS.

SEC. I.—Dicotyledons.

Clematis Vitalba L. Traveller's Joy.
Anemone nemorosa L. Wood Anemone.
Ranunculus repens L. Creeping Crowfoot.
„ acris L. Meadow Crowfoot.
„ bulbosus L. Bulbous Crowfoot.
„ sceleratus L. Celery-leaved Crowfoot.
„ Flammula L. Lesser Spearwort.
„ Ficaria L. Lesser Celandine.

* Bot. Soc. of Brit. Isles, Report 1923, p. 173.

Corydalis claviculata DC. Climbing Fumitory.
Barbarea vulgaris Br. Common Winter Cress.
Cardamine hirsuta L. Hairy Bitter Cress.
Erophila verna Mey. Whitlow Grass.
Sisymbrium officinale Scop. Hedge Mustard.
,, altissimum L. Alien.
,, Alliaria Scop. Jack by the Hedge.
,, Thaliana L. Thale Cress.
Brassica Rapa L. Turnip. Cultivated escape.
,, arvensis Kutze. Charlock.
Capsella Bursa-pastoris Med. Shepherd's Purse.
Lepidium ruderale L. Narrow-leaved Cress.
Reseda Luteola L. Dyer's Weed.
Viola Riviniana Reichb. Dog Violet.
,, odorata L. Sweet Violet.
,, tricolor L. Wild Pansy.
Silene inflata Sm. Bladder Campion.
Lychnis alba Mill. White Campion.
,, dioica L. Red Campion.
,, alba x dioica. Hybrid of last two.
Cerastium vulgatum L. Common Mouse-ear Chickweed.
,, semidecandrum L. Small Mouse-ear Chickweed.
Stellaria media Vill. Chickweed.
,, Holostea L. Greater Stitchwort.
,, uliginosa Murr. Bog Stitchwort.
Arenaria trinervia L. Three-nerved Sandwort.
,, serpyllifolia L. Thyme-leaved Sandwort.
Sagina apetala Ard. Annual Pearlwort.
,, procumbens L. Common Pearlwort.
,, ,, var. spinosa Gibs.
Spergularia rubra Presl. Red Sandwort.
Montia fontana L. Blinks.
Hypericum montanum L. Mountain St. John's Wort.
,, hirsutum L. Hairy St. John's Wort.
,, pulchrum L. Upright St. John's Wort.
,, quadrangulum L. Marsh St. John's Wort.
,, perforatum L. St. John's Wort.
,, humifusum L. Creeping St. John's Wort.
Malva sylvestris L. Common Mallow.
,, rotundifolia L. Dwarf Mallow.
Geranium dissectum L. Jagged-leaved Crane's-bill.
,, molle L. Dove's-foot Crane's-bill.
,, Robertianum L. Herb Robert.
Oxalis Acetosella L. Wood Sorrel.
Ilex Aquifolium L. Holly.
Euonymus europæus L. Spindle Tree.
Rhamnus Frangula L. Berry-bearing Alder.
,, catharticus L. Buckthorn.
Acer Pseudo-Platanus L. Sycamore.
,, ,, var. purpurea Hort.
,, campestre L. Maple.
,, platanoides L. Norway Maple.
Æsculus Hippocastanum L. Horse Chestnut.
Ulex europæus L. Gorse.
Cytisus scoparius Link. Broom.
Medicago sativa L. Lucerne.
,, lupulina L. Nonsuch.
Melilotus officinalis Lam. Melilot.
,, alba Desr. White Melilot.

Trifolium pratense L. Common purple clover.
„ repens L. Dutch Clover.
„ procumbens L. Hop Clover.
„ dubium Sibth. Small Yellow Clover.
Lotus uliginosus Schk. Marsh Bird's-Foot Trefoil.
„ corniculatus L. Bird's-Foot Trefoil.
Ornithopus perpusillus L. Bird's Foot.
Onobrychis viciæfolia Scop. Sainfoin.
Vicia sepium L. Hedge Vetch.
„ sativa L. Vetches.
„ tetrasperma Moench. Smooth Tare.
„ hirsuta Gray Hairy Tare.
Lathyrus pratensis L. Yellow Vetchling.
„ montanus Bernh. Tuberous Bitter Vetch.
Prunus avium L. Gean.
„ Cerasus L. Cherry.
„ insititia L. Bullace.
„ spinosa L. Blackthorn.
Rubus idæus L. Raspberry.
„ rhombifolius Weihe
„ villicaulis Koehl.
„ Winteri (P. J. Muell) Focke
„ rusticanus Merc.
„ sylvaticus Wh. & N.
„ laciniatus Willd.
„ Questierii Lefv. & Muell.
„ Sprengelii Weihe.
„ hirtifolius var. mollissimus Rogers
„ pyramidalis Kalt.
„ leucostachys Schleich.
„ lasioclados Focke
„ radula subsp. anglicanus Rogers
„ rudis Wh. & N.
„ Babingtonii Bell Salt
„ fuscus Wh. & N.
„ „ var. nutans Rogers
„ pallidus Wh. & N.
„ „ var. leptopetalus Rogers
„ longithyrsiger Bab.
„ foliosus Wh. & N.
„ rosaceus subsp. infecundus Rogers
„ viridis Kalt.
„ Bellardii Wh. & N.
„ hirtus subsp. Kaltenbachii Metsch.
„ dumetorum Wh. & N.
„ corylifolius Sm.
Geum urbanum L. Wood Avens.
Fragaria vesca L. Wild Strawberry.
„ chiloensis Duch. Garden escape.
Potentilla argentea L. Hoary Cinquefoil.
„ reptans L. Creeping Cinquefoil.
„ procumbens Sibth. Creeping Tormentilla.
„ sterilis Garcke. Barren Strawberry.
Alchemilla arvensis Scop. Parsley Piert.
Agrimonia Eupatoria L. Agrimony.
Rosa arvensis Huds. Trailing Rose.
„ canina L. Dog Rose.
Pyrus Malus L. Crab.
„ aucuparia L. Mountain Ash.

Pyrus torminalis Ehrh. Service Tree.
Cratægus Oxyacantha L. Hawthorn.
Chrysosplenium oppositifolium L. Golden Saxifrage.
Philadelphus coronarius L. Mock Orange. Garden escape.
Ribes Uva-crispa L. Gooseberry.
,, rubrum L. Red Currant.
,, nigrum L. Black Currant.
Callitriche stagnalis Scop. Water Starwort.
Epilobium angustifolium L. Rose-bay Willow Herb.
,, hirsutum L. Hairy Willow Herb.
,, tetragonum L. Square stalked Willow Herb.
,, roseum Schreb. Pale Willow Herb.
,, montanum L. Broad Smooth-leaved Willow Herb.
Circæa lutetiana L. Enchanter's Nightshade.
Bryonia dioica Jacq. White Bryony.
Conium maculatum L. Hemlock.
Ægopodium Podagraria L. Gout-weed.
Conopodium majus Loret. Pignut.
Chærophyllum temulum L. Rough Chervil.
Anthriscus sylvestris Hoffm. Keck.
Angelica sylvestris L. Angelica.
Heracleum Sphondylium L. Hogweed.
Caucalis Anthriscus Huds. Hedge Parsley.
Hedera Helix L. Ivy.
Cornus sanguinea L. Dogweed.
Adoxa Moschatellina L. Moschatel.
Sambucus nigra L. Elder.
Viburnum Opulus L. Guelder Rose.
Lonicera Peri-Clymenum L. Honeysuckle.
Galium Mollugo L. Hedge Bedstraw.
,, hercynicum Weig. Heath Bedstraw.
,, palustre L. Marsh Bedstraw.
,, Aparine L. Cleavers.
,, Cruciata Scop. Crosswort.
Asperula odorata L. Woodruff.
Dipsacus fullonum L. Teasel.
Solidago Virgaurea L. Golden Rod.
Bellis perennis L. Daisy.
Aster ?sp. Michaelmas Daisy. Garden escape.
Erigeron canadensis L. Canadian Flea-bane. Alien.
Gnaphalium sylvaticum L. Heath Cudweed.
Inula squarrosa Bernh. Ploughman's Spikenard.
Achilles Millefolium L. Yarrow.
Chrysanthemum Leucanthemum L. Ox-eye Daisy.
Matricaria inodora L. Scentless May-weed.
Artemisia Absinthium L. Wormwood.
,, vulgaris L. Mugwort.
,, ,, var. coarctata Fors.
Tussilago Farfara L. Coltsfoot.
Senecio Jacobæa L. Ragwort.
,, erucifolius L. Hoary Ragwort.
,, viscosus L. Stinking Groundsel.
,, sylvaticus L. Heath Groundsel.
,, vulgaris L. Groundsel.
Arctium Lappa L. Great Burdock.
Carduus crispus L. Welted Thistle.
,, ,, var. acanthoides Syme
Cirsium lanceolatum Scop. Spear Thistle.
,, arvense Scop. Field Thistle.

Centaurea nigra L. Knapweed. L.
Lapsana communis L. Nipplewort.
Picris Echioides L. Ox-tongue.
Crepis capillaris Wallr. Smooth Hawksbeard.
„ taraxacifolia Thuill. Hawksbeard.
Hieracium Pilosella L. Mouse-ear Hawkweed.
„ murorum L. Wall Hawkweed.
Hypochæris radicata L. Cat's-ear.
Taraxacum vulgare Lam. Dandelion.
„ lactistophyllum Dahlst. (*See* Svensk Fanerogamflora p. 574.)
Lactuca virosa L. Wild Lettuce.
„ muralis Fres. Wall Lettuce.
Sonchus asper Hill Rough Sowthistle.
„ oleraceus L. Common Sowthistle.
Tragopogon pratensis L. Goat's Beard.
Campanula rotundifolia L. Harebell.
Calluna vulgaris Hull Ling.
„ „ var. incana Reichb.
Rhododendron ? spp. Planted extensively.
Primula vulgaris Huds. Primrose. Old garden.
Lysimachia nemorum L. Yellow Pimpernel.
Anagallis arvensis L. Scarlet Pimpernel.
Fraxinus excelsior L. Ash.
Ligustrum vulgare L. Privet.
Centaurium umbellatum Gilib. Centaury.
Symphytum officinale L. Comfrey.
Myosotis cæspitosa Schultz Forget-me-not.
„ scorpioides L. Field Scorpion Grass.
„ versicolor Sm. Changing Forget-me-not.
Echium vulgare L. Viper's Bugloss.
Calystegia sepium Br. Large Bindweed.
Convolvulus arvensis L. Corn Bindweed.
Solanum Dulcamara L. Bittersweet.
„ nigrum L. Black Nightshade.
Atropa Belladonna L. Deadly Nightshade.
Verbascum Thapsus L. Aaron's Rod.
„ Blattaria L. Moth Mullein.
Linaria vulgaris Mill. Toad-Flax.
Scrophularia aquatica L. Water Betony.
„ nodosa L. Figwort.
Digitalis purpurea L. Foxglove.
Veronica officinalis L. Common Speedwell.
„ Chamædrys L. Germander Speedwell.
„ montana L. Mountain Speedwell.
„ serpyllifolia L. Thyme-leaved Speedwell.
„ arvensis L. Wall Speedwell.
„ agrestis L. Field Speedwell.
„ hederæfolia L. Ivy-leaved Speedwell.
Mentha aquatica L. Water Mint.
Satureia vulgaris Fritsch Wild Basil.
Nepeta hederacea Trev. Ground Ivy.
Prunella vulgaris L. Self-heal.
Stachys sylvatica L. Hedge Woundwort.
Galeopsis Tetrahit L. Common Hemp Nettle.
„ „ var. nigricans Breb.
Lamium album L. White Dead-nettle.
„ purpureum L. Red Dead-nettle.
„ Galeobdolon Cr. Yellow Archangel.
Ballota nigra L. Black Horehound.

Teucrium Scorodonia L. Wood Sage.
Ajuga reptans L. Bugle.
Plantago lanceolata L. Ribwort Plantain.
,, major L. Great Plantain.
Chenopodium album var. viride Syme Goosefoot.
,, polyspermum L. Many-seeded Goosefoot.
Atriplex patula (? sp.) L. Orache.
Polygonum dumetorum L. Hedge Bindweed.
,, Convolvulus L. Black Bindweed.
,, Persicaria L. Spotted Persicaria.
,, Hydropiper L. Water Pepper.
,, aviculare L. Knotgrass.
Rumex crispus L. Common Dock.
,, obtusifolius var. agrestis Fr.
,, sanguineus var. nemorosus Sch. Wood Dock.
,, conglomeratus Murr. Sharp Dock.
,, Acetosella L. Sheep's Sorrel.
Euphorbia Helioscopia L. Sun Spurge.
,, Amygdaloides L. Wood Spurge.
,, exigua L. Dwarf Spurge.
Mercurialis perennis L. Dog's Mercury.
,, annua L. Annual Mercury.
Ulmus scabra Mill. Wych Elm.
,, sativa Mill. Common Elm.
Cannabis sativa L. Hemp. Alien.
Urtica dioica L. Stinging Nettle.
,, urens L. Small Nettle.
Betula alba L. Birch.
,, pubescens Ehrh.
Carpinus Betulus L. Hornbeam.
Corylus Avellana L. Hazel.
Quercus Robur L. Pedunculate Oak.
,, sessilis Ehrh. Sessile Oak.
Castanea sativa Mill. Sweet Chestnut.
Juglans regia L. Walnut.
Salix alba L. White Willow.
,, Caprea L. Goat Willow.
Populus tremula L. Aspen.
,, nigra var. italica (Moench.) Lombardy Poplar.
,, alba L. Abele Poplar.

Sec. II.—**Monocotyledons.**

Listera ovata Br. Twayblade.
Narcissus Pseudo-Narcissus L. Daffodil.
Galanthus nivalis L. Snowdrop.
Tamus communis L. Black Bryony.
Ruscus aculeatus L. Butcher's Broom.
Allium ursinum L. Ramsons.
Scilla nonscripta L. & H. Bluebell.
Juncus conglomeratus L. Common Rush.
,, ,, var. effusus L.
,, bufonius L. Toad-Rush.
,, articulatus L. Shiny-fruited Rush.
Luzula pilosa Willd. Hairy Wood Rush.
,, ,, var. Borreri (Bromf.)
,, Forsteri Sm. Forster's Wood Rush.

Luzula multiflora Lej. Heath Wood Rush.
„ campestris D.C. Field Wood Rush.
Arum maculatum L. Lords and Ladies.
Lemna trisulca L. Ivy-leaved Duckweed.
„ minor L. Small Duckweed.
Alisma Plantago-aquaticum L. Water Plantain.
Scirpus setaceus L. Bristle Carex.
Carex Pseudo-cyperus L. Cyperus Sedge.
„ sylvatica Huds. Wood Sedge.
„ pilulifera L. Pill-headed Sedge.
„ remota L. Distant Spiked Sedge.
„ divulsa Stokes
Anthoxanthum odoratum L. Sweet Vernal.
Alopecurus pratensis L. Fox-tail.
„ geniculatus L. Marsh Foxtail.
Milium effusum L. Wood Millet.
Phleum pratense L. Timothy.
Agrostis alba L. White Bent.
„ canina L. Brown Bent.
„ tenuis Sibth. Fine Bent.
„ „ var. nigra Dr. Black Bent.
Aira præcox L. Early Hair Grass.
Deschampsia flexuosa Trin. Waved Hair Grass.
Holcus mollis L. Soft Grass.
„ lanatus L. Yorkshire Fog.
Trisetum flavescens Beauv. Yellow Oat Grass.
Arrhenatherum elatius M. & K. False Oat Grass.
Cynosurus Cristatus L. Crested Dog's-Tail.
Melica uniflora Retz. Wood Melic.
Dactylis glomerata L. Cock's Foot.
Poa pratensis L. Smooth Meadow Grass.
„ „ var. angustifolia L.
„ trivialis L. Rough Meadow Grass.
„ nemoralis L. Wood Poa.
„ annua L. Annual Meadow Grass.
Glyceria fluitans Br. Floating Meadow Grass.
Festuca rubra L. Red Fescue.
„ ovina L. Sheep's Fescue.
„ „ var paludosa Gaud. (= tenuifolia Sibth.).
„ bromoides L.
Bromus sterilis L. Barren Brome.
„ ramosus Huds. Hairy Brome.
„ hordeaceus L. Soft Brome.
„ „ var. glabratus Dr.
Brachypodium sylvaticum R. & S. False Brome.
Lolium perenne L. Perennial Rye Grass.
Agropyron repens Beauv. Twitch or Couch.
„ „ var. Leersianum Gray
Hordeum murinum L. Wall Barley Grass.
„ nodosum L. Meadow Barley.

DIV B.—GYMNOSPERMS.

Taxus baccata L. Yew.
Pinus sylvestris L. Scotch Fir.
Cupressus Lawsoniana var. californica (in boundary fence.)

CRYPTOGAMS.

DIV. A.—**PTERIDOPHYTA** (Vascular Cryptogams).

Sec. I.—**Filicales (Ferns).**

Pteris aquilina L. Bracken.
Dryopteris Filix-mas Sch. Male Fern.
„ aristata Dr.

MOSSES.

1917-24.

The earliest known record is for the rare Plagiothecium silesiacum found in the woods for the first time in Britain, by Mitten, in 1843. Later the eminent bryologist, E. M. Holmes, F.L.S., recorded thirty-four species "for Abbey Wood alone," followed by the late H. C. Napier, who during 1911-13 rediscovered thirty of the thirty-four noted by Holmes, failed to find four, but added fifty-eight more, thus bringing up the total to ninety-two. Of this total only seventy-six have been observed during the last seven years, but as twenty-three additional species and varieties have been recorded during that period the total now stands at one hundred and fifteen. Of these perhaps two are doubtful as Grimmia pulvinata and Orthotrichum anomalum var. saxatile, are recorded in some papers kindly sent to me by C. H. Grinling, B.A., as having been found by H. C. Napier on the "Abbey Walls," though they may also have been found in the woods. Both, however, are also included in the list of mosses for the woods compiled by the late H. C. Napier, published in the *Pioneer*, June 27th, 1913, and in consequence they are entitled to be considered with the rest. Thus out of a total of about three hundred and ten true mosses recorded for the whole of West Kent, more than one-third have been observed in the woods. Nevertheless, although the moss flora is decidedly rich in variety only a comparatively small number representing the most common and widely distributed species in the district are abundant, the remainder with a few exceptions being uncommon or scarce. This in some measure may account for species being observed by one bryologist but not by another, though a contributory cause may be the cutting down of large tracts of woodland annually. Thus in some cases the habitat is completely destroyed so that the moss or mosses must be sought for elsewhere. In this manner a fine clump of Plagiothecium silesiacum growing on a rotting branch on the ground was destroyed, the branch being continually trodden upon until broken to pieces by men collecting timber. A small remnant of the branch with a scrap

of the moss attached was removed by C. H. Grinling and the writer to a more secluded position, but the moss has now disappeared, though it is not quite extinct in the woods. It would be rash to assume that because a rare moss has been eradicated in one station that it does not occur elsewhere in the woods. Several years ago Dicranum montanum was completely destroyed in the only known station, though quite recently that species has turned up on several stumps where it is unlikely to be disturbed. Again for several years Thuidium tamariscinum entirely escaped notice, although not uncommon in adjoining woods, only to be eventually found in two widely separated stations. It is noteworthy that Dicranum flagellare first recorded by E. M. Holmes still occurs on living and decaying chestnut stools in so many stations that any risk of eradication is fortunately negligible.

A Moss Foray held on February 12th, 1921, under the leadership of W. R. Sherrin, A.L.S., and others, yielded over fifty species, all previously recorded for the woods.

In concluding these remarks I have much pleasure in acknowledging the kind assistance of W. E. Nicholson, F.L.S., in the determination of a number of the more critical species.

Nomenclature. Handbook of British Mosses. By H. H. Dixon, M.A. 3rd Edition. Published by V. V. Sumfield, Station Road, Eastbourne. 1924.

DIV. B.—**BRYOPHYTA** (Non-Vascular Cryptogams).

SEC. I.—**Musci (Mosses).**

(111 Species.)

Tetraphis pellucida Hedw. (c.fr.). E.M.H.
Catharinea undulata Web. & Mohr (c.fr.). E.M.H.
Polytrichum nanum Neck. (c.fr.). H.C.N.
„ piliferum Schreb.
„ juniperinum Willd (c.fr.). H.C.N.
„ gracile Dicks. (c.fr.). H.C.N.
„ formosum Hedw. H.C.N.
„ commune L. H.C.N.
Pleuridium subulatum Rabenh. (c.fr.). E.M.H.
„ axillare Lindb. (c.fr.).
Seligeria pusilla B. & S. (c.fr.). H.C.N.
„ paucifolia Carruth. (c.fr.). H.C.N.
Ceratodon purpureus Brid. (c.fr.). H.C.N.
Dicranella heteromalla Schp. (c.fr.). E.M.H.
„ varia Schp. (c.fr.).
„ Schreberi Schp.
Dicranoweisia cirrata Lindb. (c.fr.). H.C.N.
Campylopus flexuosus Brid. E.M.H.
„ pyriformis Brid. H.C.N.

Dicranum scoparium Hedw. E.M.H.
(„ majus Turn.) E.M.H.
„ flagellare Hedw. E.M.H.
„ montanum Hedw. E.M.H.
Leucobryum glaucum Schp. E.M.H.
Fissidens exilis Hedw. (c.fr.). H.C.N.
„ viridulus Wahl. (c.fr.).
„ pusillus Wils. (c.fr.). H.C.N.
„ incurvus Starke (c.fr.).
„ bryoides Hedw. (c.fr.). E.M.H.
„ taxifolius Hedw. (c.fr.). H.C.N.
(Grimmia pulvinata Sm. (? Abbey Walls).) H.C.N.
Phascum cuspidatum Schreb. (c.fr.).
Pottia truncatula Lindb. (c.fr.). H.C.N.
„ minutula Fuernr. (c.fr.).
Tortula ambigua Angstr. (c.fr.).
„ muralis Hedw. (c.fr.). H.C.N.
„ subulata Hedw. (c.fr.). E.M.H.
(„ intermedia Berk.) H.C.N.
(Barbula lurida Lindb.) H.C.N.
„ rubella Mitt. (c.fr.). H.C.N.
„ tophacea Mitt. (c.fr.).
„ cylindrica Schp. (c.fr.).
(„ revoluta Brid.) H.C.N.
„ convoluta Hedw. (c.fr.). H.C.N.
„ „ var. sardoa B. & S. H.C.N.
„ unguiculata Hedw. (c.fr.). H.C.N.
Leptodontium flexifolium Hampe
Weisia microstoma C.M. (c.fr.).
„ viridula Hedw. (c.fr.). H.C.N.
(Zygodon viridissimus R. Brown) E.M.H.
(Orthotrichum anomalum var. saxatile Milde ? Abbey Walls). H.C.N.
(„ diaphanum Schrad.) H.C.N.
Physcomitrium pyriforme Brid. (c.fr.). H.C.N.
Funaria hygrometrica Sibth. (c.fr.). H.C.N.
„ fasciculare Schp. (c.fr.).
Aulacomnium androgynum Schwaeg. (c.fr.). Mitten 1843 A.D.
Webera nutans Hedw. (c.fr.). H.C.N.
„ proligera Bryhn.
„ annotina Sch.
Bryum cæspiticium L. (c.fr.). H.C.N.
„ capillare L. (c.fr.). H.C.N.
„ erythrocarpum Schwaeg. (c.fr.). H.C.N.
„ atropurpureum W. & M. (c.fr.). H.C.N.
„ argenteum L. (c.fr.). H.C.N.
Mnium affine Bland. H.C.N.
„ rostratum Schrad. (c.fr.). H.C.N.
„ undulatum L. E.M.H.
„ hornum L. (c.fr.). E.M.H.
„ punctatum L. (c.fr.). H.C.N.
Neckera complanata Huebn. E.M.H.
Homalia trichomanoides B. & S. H.C.N.
Porotrichum alopecurum Mitt. H.C.N.
Anomodon viticulosus Hook. & Tayl. E.M.H.
Thuidium tamariscinum B. & S. E.M.H.
Camptothecium sericeum Kindb. (c.fr.). E.M.H.
Brachythecium glareosum B. & S. H.C.N.
„ albicans B. & S. H.C.N.
„ salebrosum B. & S.

Brachythecium rutabulum B. & S. (c.fr.). H.C.N.
,, velutinum B. & S. E.M.H.
(,, populeum B. & S.) H.C.N.
(,, cæspitosum Dixon) H.C.N.
,, purum Dixon H.C.N.
Eurhynchium piliferum B. & S. E.M.H.
,, prælongum Hobkirk (c.fr.). E.M.H.
,, Swartzii Hobkirk (c.fr.). E.M.H.
,, abbreviatum Schp. H.C.N.
,, pumilum Schp. (c.fr.). E.M.H.
,, tenellum Milde H.C.N.
,, myosuroides Schp. E.M.H.
,, myurum Dixon.
(,, striatum B. & S.) H.C.N.
,, rusciforme Milde (c.fr.). H.C.N.
(,, murale Milde) H.C.N.
,, confertum Milde (c.fr.). H.C.N.
,, megapolitanum Milde H.C.N.
Plagiothecium depressum Dixon.
,, elegans Sull. H.C.N.
,, silesiacum B. & S. (c.fr.). Mitten 1843.
,, denticulatum B. & S. (c.fr.). E.M.H.
* ,, ,, var. aptychus Spr. (c.fr.).
,, sylvaticum B. & S. (c.fr.). E.M.H.
,, undulatum B. & S. (c.fr.). E.M.H.
,, latebricola B. & S. H.C.N.
,, ,, forma gemmascens R. & H.
Amblystegium serpens B. & S. (c.fr.). E.M.H.
,, Juratzkanum Schp. H.C.N.
,, Kochii B. & S.
,, filicinum De Not.
Hypnum riparium L. (c.fr.). H.C.N.
(,, hispidulum var. Sommerfeltii Myr.) H.C.N.
,, fluitans L.
,, cupressiforme L. (c.fr.). E.M.H.
,, cupressiforme var. ericetorum B. & S.
(,, molluscum Hedw.) E.M.H.
,, cuspidatum Lindb. H.C.N.
(Hylocomium squarrosum B. & S.) E.M.H.

ABBREVIATIONS, Etc.

In brackets = Not recorded since 1917.
Without initials = Additions since 1917.
The asterisk* = Addition to West Kent records since 1917.

LIVERWORTS.

1918-24.

The distribution of the majority of such moisture-loving cryptogams as the Liverworts is necessarily almost totally restricted to the few damp banks, moist or wet grassy and chalky hollows, shaded paths, roots and tree stumps, that the woods afford, so that whilst in certain places they are fairly abundant, the greater part of both woods scarcely yields half a dozen species. Such a condition, however, has at least the advantage of assisting in the compilation of a fairly complete list, as well as to allow those

recorded to be kept under observation yearly, so that it may be safely stated that almost, if not every species listed, may still be found in the woods. It is unfortunate that with the exception of Lophozia attenuata, recorded by E. M. Holmes, and Chiloscyphus polyanthus, both still plentiful in the woods, no other hepatics appear to have been noted by those who worked the woods for mosses and other plants in bygone years, as in consequence data are lacking for what might have proved a valuable and interesting comparison with the subjoined list.

I am much indebted to W. E. Nicholson, F.L.S., for his kind assistance in the determination of a few of the more critical species.

Nomenclature. Handbook of British Hepatics. By S. M. Macvicar, F.L.S. Published by V. V. Sumfield, Station Road, Eastbourne. 1912.

Sec. II.—**Hepaticæ (Liverworts).**

(32 species.)

Riccia glauca L.
„ sorocarpa Bisch.
Lunularia cruciata (L.) Dum.
Marchantia polymorpha L.
Pellia epiphylla (L.) Corda
Fossombronia pusilla (L.) Dum.
Alicularia scalaris (Schrad.) Corda
Aplozia crenulata (Sm.) Dum.
„ „ var gracillima (Sm.) Heeg.
Gymnocolea inflata (Huds.) Dum.
Lophozia ventricosa (Dicks.) Dum.
„ bicrenata (Schmid.) Dum.
„ excisa (Dicks.) Dum.
„ attenuata (Mart.) Dum. E.M.H.
Plagiochila asplenioides (L.) Dum.
Lophocolea bidentata (L.) Dum.
„ cuspidata Limpr.
„ heterophylla (Schrad.) Dum.
„ heterophylla f. laxior Nees.
Chiloscyphus polyanthus (L.) Corda V.H.
* „ pallescens (Ehrh.) Dum.
Cephalozia bicuspidata (L.) Dum.
* „ bicuspidata var. setulosa Spruce
Cephaloziella byssacea (Roth.) Warnst.
„ bifida (Schreb.) Schiffin.
Calypogeia Trichomanis (L.) Corda
„ fissa (L.) Raddi
Lepidozia reptans (L.) Dum.
* „ reptans var. tenera (Huben.) Nees. Sym.
* „ reptans var. julacea Nees. Sym.
Diplophyllum albicans (L.) Dum.
Scapania nemorosa (L.) Dum.
„ irrigua (Nees.) Dum.
Radula complanata (L.) Dum.
Madotheca platyphylla (L.) Dum.
Lejeunea cavifolia (Ehrh.) Lindb.

The asterisk * denotes an addition to the West Kent records.

FUNGI.

1919—Feb., 1925.

Previous to 1919 no intensive mycological work appears to have been attempted in connection with the woodland, but during that year in response to an appeal* for assistance in listing the fungi, C. H. Grinling, B.A., accompanied by the writer, commenced to compile a list which with the generous aid of several well-known mycologists soon became fairly representative. This work continued until February 22nd, 1920, when several members of the British Mycological Society, including Miss Lorrain Smith, F.L.S., Miss E. M. Wakefield, F.L.S., J. Ramsbottom, M.A., F.R.S., with Mrs. Ramsbottom, Mrs. Marriott and W. Watson met at 71, Rectory Place. Most of the party visited the woods where several interesting fungi were collected, amongst which Cylindrium flavovirens and Acrostalagmus cinnabarinus, determined later by Miss A. L. Smith, proved additional records. This meeting, together with the first Autumn Fungus Foray held on October 18th, 1920, acted as an incentive to further study. In consequence, during the next two years the list had been considerably augmented with the inclusion of at least one interesting species first observed amongst nettles on October 24th, 1921. Miss Lorrain Smith, F.L.S., who most kindly determined this fungus (November 1st, 1921) as Stysanus Amyli Delacr. Bull. Soc. Mycol. Fr. XIII., p. 121—" new to Britain and only once previously recorded for France "—also kindly furnished the following description : " Coremia gregarious, sulphur-yellow then olive-green, stalks blackish brown and about 2-3 m.m. high and up to 200μ thick, densely formed of septate brown hyphæ about 3μ thick. Head globose, ·5 to 1μ in diameter, formed of spreading septate light-coloured hyphæ about 3μ thick which bear terminal or lateral chains of globose gonidia, at first clear yellow becoming dull olive-green 3-5—4-5μ in diameter."

At the second foray held on October 28th, 1922, sixteen additional records for the woods were obtained ; at the third foray on October 22nd, 1923, and the fourth foray on October 13th, 1924, sixteen and fourteen respectively. Thus the last three forays have alone furnished forty-six records for the woods since 1920 A.D., although during the intervals between them the woods were fairly well worked, frequently with the valuable aid of W. Watson, who has added a number of agarics to the list. Amongst the more noteworthy additions since 1920 are :—

Lepiota felina,
,, echinella, (See Nov. Flore des Champs, p. 6.)
Inocybe flocculosa,

* *West Kent Advertiser*, February 21st, 1919.

Mycena hiemalis,
Pleurotus acerosus,
Russula elegans,
Cantharellus cinereus,
Coniophora arida,
Clavaria botrytis,
Tulasnella violea.
Physomitra esculenta,
Galactinia indiscreta,
Erinella apala.

A number of these are probably first records for West Kent.

Of the commoner species Armillaria mellea is much less frequent where the chestnut is dominant than in the more mixed woodland. The small flowers and unhealthy appearance of Wood Anemones seriously attacked by Sclerotinia tuberosa are sufficient to attract attention to the dark brown ascophores of that fungus, but a severe attack has been noted only once, in Banks wood. Every autumn, if a number of dead capsules of bluebells are examined many will be found to be covered with sclerotia which when kept under favourable conditions for development, yield a Botrytis. Carleton Rea, M.A., has most kindly informed me "that the sclerotium on bluebell capsules is generally that of Botrytis cinerea and the disco form of this is Sclerotinia Fuckelina."

On November 1st, 1923, the underside of a dead branch in the Chalky Dell was found to be covered with a red-brown shaggy ozonium which perhaps owing to unfavourable conditions for development has remained practically unaltered up to the present time (February, 1925). It seems probable that this ozonium is the O. auricomum which Carleton Rea, F. T. Brooks and others have shown to be associated with Coprinus radians, though C. B. Plowright states that several Coprini have an ozonium form. E. W. Mason has most kindly furnished me with a number of references on this subject which may be referred to by those interested. (See Appendix B.)

As pointed out* by R. Paulson, F.L.S., Peyronel has shown the association of a number of Basidiomycetes with the roots of forest trees. Thus Amanita rubescens, Russula lepida, Russula rubra and Scleroderma aurantium are said to be associated with the Sweet Chestnut. Again, Amanitopsis vaginata, Amanita muscaria, Lactarius turpis, Boletus scaber and Scleroderma aurantium are mentioned as forming mycorrhiza on the Silver Birch. This close association of the last four agarics with the birch is noticeable in the woodland, especially in the case of the first three. In some cases the roots of the silver birch may be traced by the fruit bodies

* Tree Mycorrhiza by R. Paulson, Brit. Mycol. Trans., Vol. IX., Pt. IV., and Fungus Root by R. Paulson, Essex Nat., Vol. XX., p. 182.

of Lactarius turpis extending in irregular lines from the trunk. The association of Amanita rubescens with the Sweet Chestnut is not so easily observed as that fungus appears to be equally plentiful under hornbeam, birch and other trees. Two other species, Cortinarius hemitrichus and Hebeloma crustuliniforme also appear to favour the birch, though the majority of the agarics seem to occur under birch or chestnut indiscriminately. Roots of the oak have been observed to be matted with mycorrhiza, but the fungus associated with it has not been traced. The following agarics have appeared during autumn in the same locality for the last four years or longer :—

Psaliota xanthoderma, on a steep bank under elm, etc.

Amanita muscaria, with Lactarius turpis and Boletus piperatus under a large birch.

Pholiota pumila, with Clitocybe flaccida, on a heap of leaves and bark shreds, amid bracken.

Pholiota togularis, near the side of a path.

Cortinarius decipiens, under chestnut.

Inocybe rimosa, near the side of a path.

Hebeloma crustuliniforme with Coprinus picaceus, amongst grass and birch scrub.

Naucoria Cucumis, near the side of a path.

Psilocybe spadicea, in the Chalky Dell.

Pleurotus acerosus, on a pebbly path.

Helvella crispa, by the side of a path.

In conclusion, I acknowledge with gratitude the generous assistance and encouragement to local workers so freely bestowed by the leader at all four forays, A. A. Pearson, F.L.S., and by those other specialists including Mrs. Bayliss Elliott, D.Sc., Miss Lorrain Smith, F.L.S., Miss E. M. Wakefield, F.L.S., A. D. Cotton, F.L.S., W. G. Groves, M.A., N. Haddon, E. W. Mason, Carleton Rea, B.C.L., J. Ramsbottom, M.A., and E. W. Swanton, who have all most kindly rendered valuable assistance from time to time in the determination of species.

Nomenclature used for the larger groups :—

Basidiomycetæ. British Basidiomycetæ. By Carleton Rea, B.C.L., M.A. Published by the Cambridge University Press, Fetter Lane, E.C. 4. 1922.

Uredinales. British Rust Fungi. By W. B. Grove, M.A. Published by the Cambridge University Press. 1913.

Discomycetales. Brit. Mycol. Trans. Vol. IV., Part II., pp. 343-381. By J. Ramsbottom, M.A., F.L.S. 1913.

THALLOPHYTA.

DIV. A.—FUNGI.

BASIDIOMYCETÆ.

(241 Species.)

GASTEROMYCETALES.

PHALLINEÆ.

PHALLACEÆ.

Cynophallus caninus (Huds.) Fr.	Amongst scrub.
Phallus impudicus (Linn.) Pers.	,, ,,

LYCOPERDINEÆ.

LYCOPERDACEÆ.

Lycoperdon excipuliforme (Scop.) Pers.	Amongst scrub.
,, umbrinum Pers.	,, ,,
,, perlatum Pers.	,, ,,
,, pyriforme (Schæff.) Pers.	On stumps, etc.
Geaster fimbriatus Fr.	Under rhododendrons.

NIDULARIINEÆ.

NIDULARIACEÆ.

Crucibulum vulgare Tul.	On twigs, etc.
Cyathus striatus (Huds.) Pers.	,, ,,

PLECTOBASIDIINEÆ.

SCLERODERMATACEÆ.

Scleroderma aurantium Pers.	Banks and near paths.
,, verrucosum (Vaill.) Pers.	,, ,,

SPHÆROBOLACEÆ.

Sphæobolus stellatus (Tode) Pers.	Branches and twigs.

AGARICALES.

AGARICINEÆ.

AGARICACEÆ.

Pluteus cervinus (Schæff.) Fr.	On branches, etc.
Lepiota procera (Scop.) Fr.	Open places, etc.
,, rhacodes (Vitt.) Fr.	,, ,,
,, excoriata (Schæff.) Fr.	Near pathways.
,, acutesquamosa (Weinm.) Fr.	Under hornbeam.
,, Friesii (Lasch) Fr.	Scrub under elm.
,, felina (Pers.) Fr.	Near pathways.
,, cristata (A. & S.) Fr.	,, ,,
,, granulosa (Batsch) Fr.	Near pathways.
,, amianthina (Scop.) Fr.	,, ,,
,, carcharias (Pers.) Fr.	,, ,,
,, echinella Quél. Bern.	,, ,,
Psaliota xanthoderma Genev.	Under birch.
,, campestris (Linn.) Fr.	Grassy places.
,, sylvicola (Vitt.) Fr.	Under birch.
Anellaria separata (Linn.) Karst.	On dung.
Amanitopsis vaginata (Bull.) Roze	Amongst scrub.
,, fulva (Schæff.) W. G. Sm.	,, ,,

Amanita phalloides (Vaill.) Fr.	Amongst scrub.
,, mappa (Batsch) Fr.	,, ,,
,, ,, var. alba (Gillet) Rea	,, ,,
,, muscaria (Linn.) Fr.	Under birch.
,, rubescens (Pers.) Fr.	Under scrub.
,, ,, annulo-sulphurea Gillet	,, ,,
Armillaria mellea (Vahl.) Fr.	On decaying stumps.
Pholiota togularis (Bull.) Fr.	Near pathways.
,, pumila Fr.	On bark shreds.
Stropharia æruginosa (Curt.) Fr.	Amongst scrub.
,, squamosa (Pers.) Fr.	Chiefly near paths.
,, semiglobata (Batsch) Fr.	On dung.
,, punctulata (Kalchbr.) Fr.	On buried wood.
Cortinarius caninus Fr.	Under chestnut, etc.
,, phœniceus (Bull.) Maire	,, ,, ,,
,, sanguineus (Wulf.) Fr.	,, ,, ,,
,, cinnamomeus (Linn.) Fr.	,, ,, ,,
,, torvus Fr.	,, ,, ,,
,, armillatus Fr.	,, ,, ,,
,, hemitrichus Fr.	,, birch.
,, decipiens (Pers.) Fr	,, chestnut, etc.
Inocybe rimosa (Bull.) Fr.	Near shady paths.
,, geophylla (Sow.) Fr.	,, ,, ,,
,, ,, var. lilacina Fr.	,, ,, ,,
,, flocculosa Berk.	,, ,, ,,
Astrosporina asterospora (Quél.) Rea	
Tricholoma saponaceum Fr.	Open spaces.
,, gambosum Fr.	,, ,,
,, personatum Fr.	Grassy places.
,, nudum (Bull.) Fr.	Amongst scrub.
,, melaleucum (Pers.) Fr.	,, ,,
,, sordidum (Schum.) Fr.	Near paths.
Entoloma nidorosum Fr.	,, ,,
Hebeloma crustuliniforme (Bull.) Fr.	Shady places under birch.
Hypholoma sublateritium (Schaeff.) Fr.	Decaying stumps.
,, ,, var. squamosum Cke.	,, ,,
,, fasciculare (Huds.) Fr.	,, ,,
,, velutinum (Pers.) Fr.	On ground.
,, appendiculatum Bull.	On stumps.
,, hydrophilum (Bull.) Fr.	,, ,,
Clitocybe nebularis (Batsch) Fr.	Amongst scrub.
,, clavipes (Pers.) Fr.	,, ,,
,, aurantiaca (Wulf.) Studer	Near cypress and in open spaces.
,, odora (Bull.) Fr.	Under Chestnut, etc.
,, pithyophila (Secr.) Fr.	,, ,, ,,
,, candicans (Pers.) Fr.	,, ,, by pathway.
,, dealbata (Sow.) Fr.	Amongst scrub.
,, splendens (Pers.) Fr.	On leaves under holly.
,, flaccida (Sow.) Fr.	Amongst bracken, etc.
,, brumalis Fr.	,, birch, etc.
,, metachroa (Fr.) Berk.	,, ,,
,, ditopus Fr.	,, leaves.
,, fragrans (Sow.) Fr.	,, scrub.
Laccaria laccata (Scop.) B. & Br.	Amongst scrub, etc.
,, ,, var. amethystina (Vaill.) B. & Br.	,, ,, ,,
Hygrophorus pratensis (Pers.) Fr.	Grassy paths.
Flammula carbonaria Fr.	Burnt soil.
,, flavida (Schæff.) Fr.	On stumps.

Collybia radicata (Relh.) Berk.	On rotten stumps.
,, longipes (Bull.) Berk.	,, ,, ,,
,, platyphylla (Pers.) Fr.	,, ,, logs, etc.
,, fusipes (Bull.) Berk.	,, old stumps.
,, maculata (A. & S.) Fr.	About old stumps.
Collybia butyracea (Bull.) Fr.	Amongst scrub.
,, velutipes (Curt.) Fr.	On stumps and trees.
,, tuberosa (Bull.) Fr.	On dead agarics.
,, cirrhata (Schum.) Fr.	Amongst leaves.
,, acervata Fr.	On stumps.
,, rancida Fr.	Amongst scrub.
,, atrata Fr.	On burnt soil.
,, ambusta Fr.	,, ,, ,,
Leptonia lampropus Fr.	Grassy places.
Naucoria Cucumis (Pers.) Fr.	Near pathways, etc.
,, badipes Fr.	
Psilocybe semilanceata Fr.	Near paths.
Psilocybe spadicea Fr. (=Psathyra spadicea (Fr.) Quél.)	Chalky Dell.
Panæolus campanulatus (Linn.) Fr.	On dung.
,, papilionaceus (Bull.) Fr.	,, ,,
Mycena pura (Pers.) Fr.	Grassy, bushy places.
,, luteo-alba (Bolt.) Fr.	Mossy places.
,, flavo-alba Fr.	Bushy and heathery places.
,, rugosa Fr.	Stumps.
,, galericulata (Scop.) Fr.	,,
,, polygramma (Bull.) Fr.	,,
,, inclinata Fr.	,,
,, ammoniaca Fr.	About stumps.
,, metata Fr.	Near paths.
,, vitilis Fr.	Amongst leaves and grass.
,, sanguinolenta (A. & S.) Fr.	Amongst leaves.
,, galopus (Pers.) Fr.	,, scrub.
,, ,, var. alba Fl. Dan.	,, ,,
,, ,, var. nigra Fl. Dan.	,, ,,
,, epipterygia (Scop.) Fr.	On leaves and twigs.
,, rorida Fr.	On twigs.
,, hiemalis (Osbeck.) Fr.	On logs.
Nolanea pascua (Pers.) Fr.	Amongst scrub.
Galera tenera (Schæff.) Fr.	Near paths.
,, hypnorum (Schrank) Fr.	On moss.
Psathyra fibrillosa (Pers.) Fr.	,, ,,
Psathyrella gracilis Fr.	Grass by path.
,, atomata Fr.	,, ,, ,,
,, crenata (Lasch) Fr.	,, ,, ,,
,, disseminata (Pers.) Fr.	Stumps.
Omphalia maura Fr.	Grass by paths.
,, umbellifera (Linn.) Fr.	,, ,, ,,
,, fibula (Bull.) Fr.	Heathery places.
Tubaria furfuracea (Pers.) W.G.Sm.	On wood.
,, inquilina (Fr.) W.G.Sm.	On twigs.
Pleurotus ulmarius (Bull.) Fr.	On ash and elm.
,, ostreatus (Jacq.) Fr.	On birch stumps.
,, acerosus Fr.	On paths.
,, septicus Fr.	On decaying stumps.
Claudopus variabilis (Pers.) W.G.Sm.	On leaves, especially holly.
Russula nigricans (Bull. Fr.	Amongst scrub.

Russula lepida Fr.	Amongst scrub.
,, elegans Bres.	,, ,,
,, cyanoxantha (Schæff.) Fr.	,, ,,
,, lilacea Quél.	,, ,,
,, furcata (Pers.) Fr.	,, ,,
,, ochroleuca (Pers.) Fr.	,, ,,
,, fragilis (Pers.) Fr.	,, ,,
,, ,, var. fallax (Schæff.) Massee	,, ,,
,, emetica (Schæff.) Fr.	,, ,,
,, atropurpurea (Krombh.) Maire	,, ,,
,, ,, var. depallens (Cke.) Maire	,, ,,
,, fusca Quél.	,, ,,
,, mustelina Fr.	,, ,,
,, lutea (Huds.) Fr.	,, ,,
Lactarius turpis (Weinm.) Fr.	Under birch.
,, pyrogalus (Bull.) Fr.	Amongst scrub
,, pallidus (Pers.) Fr.	,, ,,
,, quietus Fr.	,, ,,
,, rufus (Scop.) Fr.	,, ,,
,, helvus Fr.	,, ,,
,, glyciosmus Fr.	,, ,,
,, mitissimus Fr.	,, ,,
,, subdulcis (Pers.) Fr.	,, ,,
Bolbitius titubans (Bull.) Fr.	Amongst grass.
Coprinus atramentarius (Bull.) Fr.	On wood.
,, picaceus (Bull.) Fr.	Near paths.
,, micaceus (Bull.) Fr.	Stumps, etc.
,, lagopus Fr.	On soil.
,, plicatilis (Curt.) Fr.	Near paths.
Marasmius peronatus (Bolt.) Fr.	Amongst scrub.
,, oreades (Bolt.) Fr.	Grassy places.
,, erythropus (Pers.) Fr.	Amongst scrub.
,, dryophilus (Bull.) Karst.	
,, ramealis (Bull.) Fr.	On twigs, etc.
Androsaceus rotula (Scop.) Pat.	On twigs.
,, androsaceus (Linn.) Pat.	,, ,, and leaves.
,, insititius (Fr.) Rea	,, ,, etc.
,, epiphyllus (Fr.) Pat.	On twigs, etc.
Panus stypticus (Bull.) Fr.	On stumps.

CANTHARELLINEÆ

CANTHARELLACEÆ.

Cantharellus infundibuliformis (Scop.) Fr.	Under chestnut.
,, cinereus (Pers.) Fr.	,, ,,

BOLETINEÆ.

BOLETACEÆ.

Paxillus giganteus (Sow.) Fr.	Amongst scrub.
,, involutus (Batsch) Fr.	
Boletus badius Fr.	Under rhododendrons.
,, piperatus (Bull.) Fr.	,, birch chiefly.
,, chrysenteron (Bull.) Fr.	Amongst scrub.
,, subtomentosus (Linn.) Fr.	,, ,,
,, parasiticus (Bull.) Fr.	Parasitic on Scleroderma.
,, luridus (Schæff.) Fr.	Amongst heather.
,, scaber (Bull.) Fr.	,, birch or heather.

APHYLLOPHORALES.

POROHYDNINEÆ.

POLYPORACEÆ.

Polyporus squamosus (Huds.) Fr.	On chestnut, elm, ash.
,, intybaceus Fr.	On chestnut.
,, sulphureus (Bull.) Fr.	,, ,,
,, betulinus (Bull.) Fr.	On birch.
,, adustus (Willd.) Fr.	On hornbeam.
,, cæsius (Schrad.) Fr.	On dead branches.
Sistotrema confluens (Pers.) Fr.	On stump.
Fomes igniarius (Linn.) Fr.	On ash.
,, annosus Fr.	On logs.

POLYSTICTACEÆ.

Polystictus versicolor (Linn.) Fr.	On stumps and branches.
Irpex obliquus (Schrad.) Fr.	On branches.
Lenzites betulina (Linn.) Fr.	On birch.
Dædalea quercina (Linn.) Fr.	On chestnut and oak.

MERULIACEÆ.

Merulius tremellosus (Schrad.) Fr.	On dead branches.
,, corium (Pers.) Fr.	,, ,,
Phlebia merismoides Fr.	On logs, etc.
Coniophora arida Fr.	On stump.

FISTULINACEÆ.

Fistulina hepatica (Huds.) Fr.	On chestnut, etc.

HYDNACEÆ.

Acia uda B. & G.	Dead branches.
Grandinia farinacea (Pers.) B. & G.	,, ,,
,, helvetica (Pers.) Fr.	,, ,,
,, granulosa Fr.	
Phylacteria terrestris (Ehrh.) Big. & Guill.	Heathery places.
Hypochnus fuscus (Pers.) Fr.	Dead wood.
,, fumosus Fr.	,, ,,

THELOPHORACEÆ.

Stereum rugosum (Pers.) Fr.	Stumps.
,, hirsutum (Willd.) Fr.	,,
,, purpureum (Pers.) Fr.	Birch stumps.
Corticium laeve (Pers.) Quél.	Dead branches, etc.
,, Sambuci (Pers.) Fr.	,, ,, ,,
,, botryoides (Schwein.) Burt.	,, wood.
,, subcoronatum von Hoehn. & Litsch.	,, branches, etc.
,, confluens Fr.	,, ,,
Peniophora cremea Bres.	Dead branches, etc.
,, velutina (DC.) Cke.	,, ,, ,,
,, setigera (Fr.) Bres.	,, ,, ,,
,, gigantea (Fr.) Massee	,, ,, ,,
,, incarnata (Pers.) Cke.	,, ,, ,,
,, cinerea (Fr.) Cke.	,, ,, ,,

CYPHELLACEÆ.

Cyphella capula (Holmsk.) Fr.	Dead Nettle stems, etc.

CLAVARIINEÆ.

CLAVARIACEÆ.

Clavaria cristata (Holmsk.) Fr.	On earth.
,, cinerea (Bull.) Fr.	,, ,,

Clavaria rugosa (Bull.) Fr.	Amongst grass.
,, corniculata (Schæff.) Fr.	On earth.
,, botrytis (Pers.) Fr.	Amongst grass.
,, stricta (Pers.) Fr.	On logs, etc.
,, dissipabilis Britzl.	Amongst scrub.
,, vermicularis Fr.	,, grass.

AURICULARIALES.

AURICULARIINEÆ.

AURICULARIACEÆ.

Auricula auricula-Judæ (Linn.) Schroet.	Chiefly on elders.

TREMELLALES.

TREMELLACEÆ.

Tremella mesenterica (Retz.) Fr.	Dead wood, etc.
,, albida (Huds.) Fr.	,, ,, ,,

TULASNELLALES.

TULASNELLACEÆ.

Tulasnella violea (Quel.) Bourd & Galz.	Dead wood, etc.

CALOCERALES.

CALOCERACEÆ.

Dacryomyces deliquescens (Bull.) Duby.	Dead Wood.
Calocera viscosa (Pers.) Fr.	,, ,,
,, cornea (Batsch) Fr.	,, ,,
,, stricta Fr.	,, ,,

UREDINALES.

(13 species.)

Uromyces Ficariæ Lév. Teleutospores.	On Ranunculus Ficaria.
,, Poæ Rabenh. Æcidia.	,, ,,
Puccinia obtegens Tul. Uredospores.	On Cirsium arvense.
,, Adoxæ Hedw. Teleutospores.	On Adoxa moschatellina.
,, Violæ DC. Æcidia.	On Viola odorata.
,, Malvacearum Mont. Teleutospores.	On Malva sylvestris.
,, fusca Wint.	On Anemone nemorosa.
Phragmidium violaceum Wint. Æcidia and Teleutospores.	On Rubus fruticosus.
Kuehneola albida Magnus.	,, ,, ,,
Melampsora Rostrupii Wagner. Æcidia.	On Mercurialis perennis.
,, Tremulæ Tul. Uredospores.	On Populus tremula.
Pucciniastrum Circaeæ Speg. Uredospores.	On Circaea lutetiana.
,, pustulatum Dietel. Uredospores.	On Epilobium angustifolium.

USTILAGINALES.

Ustilago antherarum Fr.	On anthers of Lychnis alba.

ASCOMYCETÆ.

PYRENOMYCETALES.

(22 species.)

Uncinula aceris (DC.) Sacc.	On maple.
Nectria cinnabarina (Tode.) Fr.	On bark.
,, coccinea (Pers.) Fr.	On wood.
,, episphæria (Tode.) Fr.	,, ,,
Hypocrea rufa (Pers.) Fr.	On bark.

Epichloe typhina (Pers.) Tul.	On grass stems.
Leptospora spermoides (Hoffm.) Fckl.	On hazel.
,, ovina (Pers.) Fckl.	On rotten wood.
Rosellinia aquila (Fr.) de Not.	On dead wood.
Leptosphæria Doliolum (Pers.) Ces & de Not.	On nettle stems.
Diaporthe (chorostate) leiphæmia (Fr.) Sacc.	On oak.
,, (tetrastagon) controversa (Desm.) Fckl.	On ash.
Entypa flavovirens (Fr.) Tul.	On rotten wood.
,, lata (Pers.) Tul.	,, ,,
,, scabrosa (Bull.) Fckl.	On dead wood.
Peronentypa corniculata (Ehrh.) Berl.	On ash and elm.
Cryptosphœria eunomia (Fr.) Fckl.	On ash.
Diatrype stigma (Hoffm.) de Not.	On bark.
Diatrypella verrucæformis (Ehrh.) Nits.	On birch.
,, favacea (Fr.) Ces. & de Not.	On birch.
Hypoxylon coccineum Bull.	?
Xylaria hypoxylon (Fr.) Grev.	On stumps.

DISCOMYCETALES.

(31 species.)

Physomitra esculenta (Pers.) Boud.	On sandy ground.
Helvella crispa (Scop.) Fr.	Shaded ground.
Cyathipodia villosa (Hedw.) Boud.	Shaded paths.
Acetabula vulgaris Fuck.	Chalky ground.
Aleuria vesiculosa (Bull.) Boud.	Paths, etc.
,, cerea (Sow.) Gill.	On the ground.
Galactinia badia (Pers.) Boud.	,, ,,
,, indiscreta (Phill. and Plowr.) Boud.	Chalky ground.
Lachnea hemisphærica (Wigg.) Gill.	On the ground.
Cilaria scutellata (Linn.) Quél.	
Cheilymenia stercorea (Pers.) Boud.	On dung.
Humaria pilifera (Cooke) Sacc.	On moss.
Ascobolus stercorarius (Bull.) Schroet.	On dung.
Cudoniella acicularis (Bull.) Schroet.	On stumps, etc.
Calycella ferruginea (Schum.) Boud.	On bark shreds.
Melachroia xanthomela (Pers.) Boud.	On earth.
Coryne sarcoides (Jacq.) Tul.	On wood.
Bulgaria inquinans (Pers.) Fr.B.	On oak logs.
Orbilia vinosa (Alb. et Schw.) Karst.	On bark.
,, xanthostigma Fr.O.	On wood.
Sclerotinia tuberosa (Hedw.) Fuck.	On rhizomes of wood anemone.
Helotium phyllophilum (Desm.) Karst.	On leaves.
,, fructigenum (Bull.) Fuck.	On acorns.
,, virgultorum (Wahl.) Karst.	On dead branches.
Dasyscypha nivea (Hedw. fil.) Sacc.	On rotten wood.
Erinella apala (B. et Br.) Sacc.	On rush stems.
Trichoscypha resinaria (Phill.) Boud.	On rotten wood.
Mollisia cinerea (Batsch) Karst.	On dead wood.
,, melaleuca (Fr.) Sacc.	,, ,,
Stegia Ilicis Fr.	On holly leaves.
Rhytisma acerinum (Pers.) Fr.	On sycamore leaves.

PHYCOMYCETÆ.

ZYGOMYCETALES.

Mucor mucedo (Linn.) Bref.	On decaying agarics.

DEUTEROMYCETÆ.

SPHÆROPSIDALES.

Phomopsis glandicola Grove.	On oak apples.

HYPHOMYCETALES.

(13 species.)

Monilia aurea Genel.	On dead branches.
Cylindrium flavo-virens Bon.	On oak leaves.
Oidium alphitoides Griff and Maubl.	,, ,,
,, Cratægi Grogn.	On rowan berries.
Botryosporium pulchrum Corda	On nettle stems.
Trichoderma lignorum Harz. (=T. viride Pers.) (Conidial form of Pyreno. Hypocrea rufa. Massee).	On bark.
Botrytis argillacea Cke.	On wood.
,, cinerea Pers.	On leaves, etc.
Acrostalagmus cinnabarinus Corda.	On dead stems.
Stilbum erythrocephalum Ditm.	On dung.
Isaria farinosa Fr.	On moth chrysalis.
Stysanus amyli Delær., Oct. 24, 1921 (first record for the country).	On rotting stems, etc.
Tubercularia vulgaris Tode	On branches.

LICHENS.

1920-24.

The only old records obtainable are those listed for "Abbey Wood" in the "Woolwich Surveys," 1909 A.D. As these in all probability may be referred to the woodland they are all included in the appended list. Owing to the smoky atmosphere, as also to the almost total absence of walls or rocks, the lichen flora is poorly represented, most of even the few species listed being scarce. Of those more abundant, C. macilenta with the form *scolecina* appears to be dominant in both woods, though C. furcata with the variety *recurva* is also plentiful.

Nomenclature. Handbook of British Lichens. By Miss A. Lorrain Smith, F.L.S. Published by the British Museum, Cromwell Road, S.W. 7. 1921.

DIV. B.—**LICHENS.**

(12 species.)

Collema pulposum Ach.
Peltigera canina Willd. W.S.
(Parmelia physodes Ach.) W.S.
(,, olivacea Ach.) W.S.
(Evernia prunastri Ach.) W.S.
Lecanora varia Ach.

Cladonia pyxidata Hoffm. W.S.
,, furcata Schrad.
,, ,, var. recurva Hoffm.
,, macilenta Hoffm. W.S.
,, ,, f. scolecina Nyl.
(Lecidea granulosa f. viridula Cromb.) W.S.
Buellia canescens De Not.
(Verrucaria glaucina Ach.) W.S.

I am grateful to Miss Lorrain Smith, F.L.S., and R. Paulson, F.L.S., for the determination of several species.

Abbreviations, etc.—In brackets =old records not recently corroborated.
Without initials =recent additions.

MYCETOZOA.

1918-1924.

During the first three years the search for Mycetozoa was unfortunately only considered a side issue consisting of an occasional hunt for specimens when collecting fungi and other plants, the result, as might be expected, only accounting for a few common species. During later years, however, a more careful and systematic investigation has revealed a considerable number, though perhaps less than might be expected where stumps, logs, poles, branches, bundles of discarded pea sticks, chips and bark shreds, may always be found in nearly every stage of decomposition, not only in the drier, but also in the damper portions of the woods.

With this mass of material favourable to the growth of plant animals,of which only a comparatively small portion can be examined over a long period, it is little wonder additional species turn up annually so that it is not easy to estimate the number the woods might eventually yield. The erratic appearance of some species is evidenced by the abundance of the conspicuous Diderma deplanatum and Diderma hemisphæricum first recorded for the woods amongst bundles of decaying sticks last October (1924), although the sticks had been frequently examined during previous years. Again Dictydiæthalium plumbeum first appeared in 1920 A.D. on branches which though examined from time to time have never yielded a single specimen since. Quite a number of species occur on the decaying leaves, male catkins and stools of the sweet chestnut, fine gatherings of Cribraria rufa, Trichia verrucosa, Arcyria denudata, A. ferruginea and A. cinerea being obtained by Mrs. and F. Epps with the writer from the decaying stumps of that tree during last October (1924). Of these C. rufa represented a large spored form—spores 8-10 μ.—not previously noted in the woods. Nevertheless, the majority of those observed on dead wood favour the

oak, birch, ash, elder, or more rarely the elm. It is perhaps noteworthy that Trichia varia appears to be partial to ash stumps in both woods.

I wish to acknowledge with gratitude the most generous assistance of Miss G. Lister, F.L.S., in the determination of a number of species.

Nomenclature. Mycetozoa. By A. Lister, F.R.S. Revised by Miss G. Lister, F.L.S. 3rd Edition. Published by the British Museum. 1925.

Mycetozoa.

(46 species.)

Ceratiomyxa fruticulosa Macbr.	On rotten wood.
Badhamia utricularis Berk.	On ash and oak logs.
,, panicea Rost.	On elder.
Physarum viride Pers.	On dead branches, etc.
,, ,, var. aurantium Lister	,, ,, ,, ,,
,, nutans Pers.	,, ,, ,, ,,
,, ,, var. leucophæum Lister	,, ,, ,, ,,
,, sinuosum Weinm.	On bramble and chestnut leaves.
Fuligo septica Gmelin Syst.	On bark shreds, etc.
Craterium leucocephalum Ditm.	On holly leaves.
,, minutum Fries Syst.	On dead nettles, etc.
Leocarpus fragilis Rost.	On nettle stems, etc.
Diderma hemisphæricum Har.	On birch and ash sticks.
,, floriforme Pers.	,, ,, ,, ,,
,, deplanatum Fries Syst.	On birch and chestnut sticks and leaves.
,, effusum Marg.	On bramble leaves.
Diachæa leucopoda Rost.	On chestnut leaves, etc.
Didymium difforme Duby Bot.	On nettle leaves, etc.
,, Clavus Rabenh.	On chestnut catkins.
,, squamulosum Fries Symb.	On holly leaves, etc.
,, nigripes Fries Syst.	On rushes, etc.
Stemonites fusca Roth in Roem.	On rotten stumps.
Comatrichia nigra Schroeter	On dead branches.
,, typhoides Rost.	On dead wood.
Lamproderma violaceum Rost.	On ash sticks, etc.
Cribraria argillacea Pers.	On dead elder, etc.
,, rufa Rost.	On chestnut stools, etc.
,, vulgaris Schrad.	On dead chestnut, etc.
Dictydiæthalium plumbeum Rost.	On dead ash and elm sticks.
Reticularia Lycoperdon Bull.	On oak and chestnut stumps, etc.
Lycogola epidendrum Fries Syst.	On dead stumps, etc.
Trichia verrucosa Berk.	On chestnut stumps, etc.
,, affinis de Bary	On dead wood.
,, persimilis Karst.	On dead elder, etc.
,, varia Pers.	On dead ash, etc.
,, contorta Rost.	On dead ash branches, etc.
,, ,, var. inconspicua Lister	On dead wood and red brown fungus mycelium.
,, decipiens Macb.	On dead birch and ash, etc.
,, Botrytis Pers.	On dead oak, etc.
,, ,, f. cerifera G. Lister	On dead oak logs.

Arcyria ferruginea Sauter in Flora.	On dead chestnut, etc.
,, cinerea Pers.	On dead twigs and oak leaves, etc.
,, pomiformis Rost.	On dead elder, etc.
,, denudata Wettstein in Verh.	On dead oak, etc.
,, incarnata Pers.	,, ,, ,, ,,
,, nutans Grev.	On dead elm, birch, etc.
Perichæna depressa Libert Pl. Crypt.	On birch and ash bark, etc.
,, corticalis Rost.	,, ,, ,, ,, ,,
*Margarita metallica Lister l.c.	On dead ash branches.
*Dianema depressum Lister Mycet.	,, ,, ,, ,,

The asterisk * denotes an addition to the West Kent records.

Part II.—THE FAUNA.

INTRODUCTION TO THE FAUNA.

The ever increasing extension of the suburbs which is responsible for the disappearance of some of the larger life-forms in the district, reflects on the woodland, but nevertheless insect-life is still abundant there, although the mammals, reptiles and amphibians are poorly represented. With the exception of the appended lists, mostly incomplete and covering only a few groups, the Fauna of the woodland appears to have been neglected. No satisfactory records are available for even the Beetles, Bugs, Flies or Molluscs, all well worked for the district prior* to 1909 A.D. Moreover, it is regrettable that practically no attention has been paid to the Hymenoptera and particularly to those insects in that group specially adapted for the cross-pollination of flowers. This is the more disappointing because observations over a number of years tend to show that the Hymenoptera are well represented in the woods.

It is noticeable that certain creatures are more frequent in particular haunts than elsewhere in the woodland. Thus the rabbit prefers to burrow in the slopes rather than in the lower damper ground : the brown rat frequents the fences by the farm where food is plentiful ; and the lizard is rarely seen except on the more open healthy places. The grass snakes hybernate on certain dry slopes where peat and leaf mould collectors frequently meet with a number of them during the winter, though on other similar slopes they are scarce.

Of the migratory birds several pairs of Nightingales and Nightjars visit the woods every Spring, each pair resorting to a special locality. In both these cases it is probable that the chosen sites have proved secure for nesting and that particular insects or larvæ used in the feeding of the young are easily obtained there. Even the Cuckoos appear to visit one part of the woodland more than another, perhaps

* Woolwich Surveys.

in order that the female may " victimise the same species of fosterer with which she was reared.*" The Wood Ants also show some partiality in the choice of their nesting sites, for as a general rule their nests are constructed on the spurs or slopes, though small nests are occasionally met with in the lower ground. It is possible not only to smell but to see the formic acid ejected by a swarm of these ants when the nest is disturbed, but for such an observation it is necessary that the sun should shine across the nest at an angle not easily defined.

Of the injurious larvæ of insects those of the Oak Roller Moth (Tortrix viridana) are frequently so abundant as almost to denude the oaks of their young foliage in spite of the numerous insectivorous birds that flock to the banquet. At such times the House Sparrows which visit the woods in hundreds to feed on the larvæ and pupæ are perhaps the most effective agents in checking the increase of the moth. When the ravages of these larvæ are so severe as to strip every vestige of leaf from the oaks, the chestnuts, usually immune from any serious attack by larvæ, also suffer, but only to an inconsiderable degree. Of the wood-boring larvæ of beetles and other insects the Green Woodpeckers take daily toll, especially during the winter, when ants, their favourite food, are not easily obtained.

The Pond life would well repay investigation. In September and October, 1921, F. J. Epps and the writer, obtained a number of interesting specimens from Pine pool, the result of a few hours dragging ; but, unfortunately, in addition to the commoner water beetles, only the following species were determined :

Hydra viridis,
,, fusca,
Vorticella Nebulifera,
Coleps hirtus,
Paramæcium sp.,
Cyclops quadricornis,
Daphnia pulex,
and the sponge, Ephydalia fluviatalis.

The vegetation included an abundance of filamentous algæ mingled with Volvox globator, Desmids, and Diatoms. The Carp, Ten-spined Stickleback, and the Common Newt are all well represented in this pool.

* The Cuckoo. G. T. Scholey. Rochester Nat., No. 130, Vol. vi.

MAMMALS.

The only old record of interest is the skull of a Polecat previously mentioned as found in a Denehole, 1907-8 A.D. Of the other mammals listed the common bat and the rabbit are the most frequently observed, though the stoats leave plenty of evidence of their presence in the woods. Perhaps stray domestic cats cause the most damage during the bird-nesting season, but when young rabbits are plentiful, the attention of these felines is mostly confined to such easy prey. The red squirrel, though always scarce, may occasionally be seen in Banks wood. The North American grey squirrel, well distributed in some parts of Kent, does not appear to have been recorded outside the metropolitan area nearer to the woods than Keston.*

Nomenclature. Woolwich Surveys. Edited by C. H. Grinling, B.A., T. A. Ingram, M.A., LL.D., and B. C. Polkinghorne, B.Sc., F.C.S. 1909. Published by the Pioneer Press, 3, New Road, Woolwich.

MAMMALIA.

(13 Species)

CHIROPTERA.

VESPERTILIONIDÆ.

Vesperugo pipistrellus Sch.	Common Bat.	
Vesperugo noctula Sch.	Great Bat.	Several bats much larger than the pipistrella have been noted which probably belong to this species.

INSECTIVORA.

ERINACEIDÆ.

Erinaceus europæus L.	Hedgehog.	Common.

TALPIDÆ.

Talpa europæa L.	Mole.	Common.

SORICIDÆ.

Sorex vulgaris L.	Common Shrew.	A few dead specimens seen.

CARNIVORA.

Mustela erminea L.	Stoat.	Not uncommon. Nest with young noted.
Mustela vulgaris Erxl.	Weasel.	Not uncommon.
Mustela putorius L.	Polecat.	Skull found in a Denehole.

* Essex Nat. Vol. XX., Part IV., pp. 195-6.

RODENTIA.

SCIURIDÆ.

Sciurus vulgaris L. Squirrel.	A few chiefly in Banks Wood.

MURIDÆ.

Mus decumanus Pall. Brown Rat.	Not uncommon, in hedge banks on the boundary near the farm.
Mus sylvaticus L. Longtailed mouse.	Fairly common.

LEPORIDÆ.

Lepus europæus Pall. Hare.	One or two noted in autumn.
„ cuniculus L. Rabbit.	Fairly plentiful at times.

AVES (BIRDS).

1915—24.

As might be expected in woods only just outside the London area, nearly surrounded by public roads, lanes, or footpaths, and almost adjoining the much frequented common lands of Bostall Heath, bird life is not abundant, the individuals of what are quite frequent species in similar but more secluded areas being in some cases rare, scarce, or uncommon, in other cases unrecorded. It is true that a certain measure of protection is afforded owing to the woods being private, but in woods thus situated, only the most careful and incessant watching would prevent the sad destruction of nests which occurs every spring. Under adequate protection, we should expect to see most of the warblers at present recorded more numerous—the pheasant, moorhen, turtle dove, pigeon, with perhaps, the wild duck, nesting more regularly, and all the three owls more plentiful, as also the return of the tree-creeper, with possibly the wryneck and nuthatch, the last named apparently an occasional visitor to woods near by. We should probably find the heron and kingfisher more constant visitors, the goldfinch, hawfinch, and linnet, occasional visitors, if not nesting, besides a considerable increase in number of individuals of most of the commoner species. One of the most deterrent natural factors to an abundant bird life is perhaps the absence of a stream so attractive to many species, to which may be added the large acreage where nesting sites are scarce and the too frequent indiscriminate shooting which in some years has continued far beyond the legitimate season. All things considered, however, we are fortunate in being able to record even so many species. Observations of the arrival of the summer visitors extending from 1915-23, show that nearly all the warblers arrived later in 1917 than in any other year, the majority being scarcer than usual, but it must be admitted late arrivals more easily escape notice owing to the rapid increase in the density of the foliage during a week or two in spring.

AVES (BIRDS).

(64 species.)

ORDER PASSERES.

FAMILY TURDIDÆ.

Turdus viscivorus L. Missel Thrush. Resident. Common, especially in autumn.

Turdus musicus L. Song Thrush. Resident. The majority, however, appear to be summer visitors as comparatively few are seen after September.

Turdus iliaceus L. Redwing. Winter visitor. E.A., October 25th, 1916.

Turdus pilaris L. Fieldfare. Winter visitor. E.A., October 28th, 1916. Both the last mentioned and this species were scarce for three years after the severe January of 1917, when numbers perished.

Turdus merula L. Blackbird. Resident. Common.

Erithacus rubecula L. Redbreast. Resident. Common.

Daulias luscinia L. Nightingale. Summer visitor. A few pair visit the woods annually restricting their nesting sites to a few favourite localities mostly in the lower ground. E.A., April 17th, 1920.

Sylvia cinerea Bech. Whitethroat. Summer visitor. Not uncommon. E.A., April 20th, 1920.

Sylvia curruca L. Lesser Whitethroat. Summer visitor. Scarce. E.A., April 28th, 1920. Several nests noted.

Sylvia atricapilla L. Blackcap Warbler. Summer visitor. Not uncommon. E.A., April 15th, 1915.

Sylvia hortensis Bech. Garden Warbler. Summer visitor. Not uncommon. E.A., April 15th, 1920.

Regulus cristatus K.L. Koch. Gold Crest. Resident. Not uncommon, but never nests. Small companies seen occasionally in winter may be winter visitors.

Phylloscopus rufus Bech. Chiffchaff. Summer visitor. Scarce, several nests with eggs in early May.

Phylloscopus trochilus L. Willow Wren. Summer visitor. Very common. E.A., April 15th, 1922.

Phylloscopus sibilatrix Bech. Wood Wren. Summer visitor. Rare; never nests. E.A., April 29th, 1915.

Accentor modularis L. Hedge Sparrow. Resident. Common.

PARIDÆ.

Acredula caudata L. Long-tailed Tit. Resident. Never nests. Common during the winter, especially since 1920.

Parus major L. Great Tit. Resident. Common.

Parus britannicus L. Coal Tit. Resident. Fairly common.

Parus palustris L. Marsh Tit. Resident. Two or three pairs noted annually, generally in winter.

Parus cæruleus L. Blue Tit. Resident. Common.

TROGLODYTIDÆ.

Troglodytes parvulus L. Wren. Resident. Common.

CERTHIIDÆ.

Certhia familiaris L. Tree Creeper. Resident. Rare.

MOTACILLIDÆ.

Motacilla lugubris Tem. Pied Wagtail. Resident. Only seen flying over from the adjoining meadows.

Anthus trivialis L. Tree Pipit. Summer visitor. Fairly common. Nests regularly. E.A., April 17th, 1920.

Anthus pratensis L. Meadow Pipit. Resident. Rarely on the higher ground.

MUSCICAPIDÆ.

Muscicapa grisola L. Spotted Flycatcher. Summer visitor. E.A., May 1st, 1915. Only rarely seen by the pools, soon after arrival.

HIRUNDINIDÆ.

Hirundo rustica L. Swallow. Summer visitor. Only seen flying over. E.A., April 24th, 1921.

Chelidon urbica L. House Martin. Summer visitor. Very rarely seen flying over.

Cotile riparia L. Sand Martin. Summer visitor. Occasionally seen flying over. E.A., April 3rd, 1921.

FRINGILLIDÆ.

Ligurinus chloris L. Greenfinch. Resident. Uncommon.

Passer domesticus L. House Sparrow. Resident. Very common, especially when the larvæ of the oak roller moth abound.

Fringilla cœlebs L. Chaffinch. Resident. Common.

Fringilla montifringilla L. Brambling. Winter visitor. The remains of one picked up October 13th, 1920, probably killed by hawk or owl whilst on passage.

Acanthis cannabina L. Brown Linnet. Resident. Very rare.

Acanthis rufescens Vieil. Lesser Redpole. Resident. Common in winter, rarely nests.

Pyrrhula europæa Vieil. Bullfinch. Resident. A few pair always to be found. Nests regularly.

STURNIDÆ.

Sturnus vulgaris L. Starling. Resident. Common.

CORVIDÆ.

Garrulus glandarius L. Jay. Resident. Common.

Corvus frugilegus L. Rook. Resident. Common.

ALAUDIDÆ.

Alauda arvensis L. Skylark. Resident. Flocks occasionally fly over in winter.

PICARIÆ.

CYPSELIDÆ.

Cypselus apus L. Swift. Summer visitor. Rarely seen flying over. E.A., April 23rd, 1916.

CAPRIMULGIDÆ.

Caprimulgus europæus L. Nightjar. Summer visitor. Fairly common E.A., May 2nd, 1916.

PICIDÆ.

Gecinus viridis L. Green Woodpecker. Resident. Fairly common.

Dendrocopus major L. Great Spotted Woodpecker. Resident. Not uncommon.

Dendrocopus minor L. Lesser Spotted Woodpecker. Resident. Rare.

ALCEDINIDÆ.

Alcedo ispida L. Kingfisher. Resident. Several used to haunt the pools. Last seen October, 1921.

CUCULIDÆ.

Cuculus canorus L. Cuckoo. Summer visitor. Common. E.A., April 21st, 1916.

STRIGES.

STRIGIDÆ.

Strix flammea L. Barn Owl. Resident. Not uncommon.
Strix aluco L. Tawny Owl. Resident. Fairly common.
Athene noctua Scop. Little Owl. Resident (originally imported). Fairly common.

ACCIPITRES.

FALCONIDÆ.

Accipiter nisus L. Sparrow Hawk. Resident. Not uncommon.
Falco tinnunculus L. Kestrel. Resident. Not uncommon.

HERODIONES.

ARDEIDÆ.

Ardea cinerea L. Heron. Resident. Occasionally visits the pools.

ANSERES.

ANATIDÆ.

Anas buscas L. Wild Duck. Resident. A few visit the pools annually. Young duck have been noted.

COLUMBÆ.

COLUMBIDÆ.

Columba palumbus L. Wood Pigeon. Resident. Common, never numerous.
Turtur communis Selby. Turtle Dove. Summer visitor. Fairly common, but scarcer during late years. E.A., May 2nd, 1916.

GALLINÆ.

PHASIANIDÆ.

Phasianus colchicus L. Pheasant. Resident. A few seen annually.
Caccabis rufa L. French Partridge. Resident (introduced). Said to have been seen in the small wood from nest in the adjoining orchard. Corroboration needed.

FULICARIÆ.

RALLIDÆ.

Gallinula chloropus L. Moorhen. Resident. Scarce, still a few by the pools. Last noted December, 1923.

LIMICOLÆ.

CHARADRIIDÆ.

Vanellus vulgaris Beech. Lapwing. Resident. Flocks pass over in winter.

SCOLOPACIDÆ.

Scolopax rusticula L. Woodcock. Winter visitor. Not uncommon. E.A., October 26th, 1916. Odd pairs would probably stay to breed if left undisturbed as several have been noted as late as March 20th.

GAVIÆ.

LARIDÆ.

Larus ridibundus L. Black-headed Gull. Flocks frequently fly over in rough weather.
Larus canus L. Common Gull. Flocks fly over in rough weather. Wounded bird picked up, November, 1922.

ABBREVIATION USED IN THE LIST :—

E.A. — Earliest date on which the arrival of the summer or winter visitor was noted during the years 1915-23.

REPTILES, AMPHIBIANS, FISHES.

Two old records, one of a dead viper which a peat collector, quite familiar with the grass snake, states that he observed in the woods some ten years ago ; the other of the crested newt, said to be once common in the Cundite pond, must be considered doubtful until further evidence is forthcoming.

During the summer grass snakes may be seen swimming leisurely around the Cundite pond, probably in search of frogs, newts and smaller creatures that abound there.

The Carp in Pine pool probably owe their origin to the ornamental pleasure grounds, as there is no evidence that the pool existed when the Abbey was a flourishing Monastery.

REPTILIA.

LACERTILA.

LACERTIDÆ.

Lacerta vivipara D. & B. Common Lizard. Scarce ; a few amongst heather on the higher ground.
Anguis fragilis D. & B. Blindworm. Scarce.

OPHIDIA.

VIPERIDÆ.

Tropidonotus natrix L. Grass Snake. Common.
Pelias berus L. Viper. Old doubtful record.

AMPHIBIA.

ECAUDATA.

RANIDÆ.

Rana temporaria L. Common Frog. Common.

BUFONIDÆ.

Bufo vulgaris Laur. Toad. Not uncommon.

CAUDATA.

SALAMANDRIDÆ.

Molge vulgaris L. Common Newt. Abundant in the pools.
Molge cristata L. Crested Newt. Said to have been taken from the Cundite pond. Corroboration needed.

PISCES.

Gasterosteus pungitus L. Ten-spined Stickleback. Pine pool.
Gasterosteus aculeatus L. Three-spined Stickleback. Pine pool.

CYPRINIDÆ.

Cyprinus carpio L. Carp. Pine Pool.

GALLS.

The galls have so far received little attention and in consequence the list only includes a few, mostly common forms. The most evidently injurious gall causer appears to be Saperda populnea, as the numerous large swellings on the branches caused by that beetle not only disfigure but prevent the natural growth of the young aspen almost wherever that tree occurs in the woodland. One of the Diptera is not unfrequently associated with the larvæ of Saperda in the galls, several specimens being obtained from galled branches collected in Boarer's wood during June, 1922, for the purpose of obtaining specimens of the beetle. In addition, a large ichneumon was captured apparently in the act of depositing her eggs in the galled branches. Both these insects were identified by F. Laing, of the British Museum, who also kindly furnished the following remarks given in extract :—

" The ichneumon is Ephialtes tuberculatus Fourc. This has been recorded before for Saperda. The flies are Billæa irrorata Mg. This is a parasite on Saperda." F. Laing further explained that from his own observations he considered Billæa more local than rare, the chief reason that no account of its appearance in this country had yet been published (July, 1922) being due to the difficulty in the determination of the species of a family avoided by many entomologists. Also, because owing to the abundance of the galls of Saperda entomologists passed them by with indifference with the exception of those who wished to breed out the beetles to complete a series.

In a subsequent note F. Laing kindly supplemented the above remarks as follows : " Major E. E. Austin has dealt with the British records in the Ent. Mon. Mag., August, 1922, p. 182, which has drawn forth from C. J. Wainwright (Op. cit., p. 225) the statement that he captured a single specimen in Ran Dan woods, Worcestershire, in August, 1898, which remained undetermined until 1909 A.D." Later observations in the woods show that the ichneumon is rarely to be seen and the flies not easily obtained.

E. W. Swanton has most kindly assisted in the determination of several gall causers.

Nomenclature. British Plant Galls. By E. W. Swanton. Published by Methuen & Co, 36, Essex Street, W.C. 1912.

GALLS.

(26 Species.)

CAUSED BY ARTHROPODA.

ACARINA.

Pyrus Aucuparia L.	galled by	Eriophyes pyri Pag.
Corylus Avellana L.	,,	Eriophyes Avellanea Nal.
Acer campestre L.	,,	Eriophyes macrochelus Nal.
Betula alba L.	,,	Eriophyes rudis Canest.
Acer Pseudo-platanus L.	,,	Phyllocoptes acericola Nal.

CAUSED BY TRUE INSECTS (HEXAPODA).

COLEOPTERA.

Populus tremula L.	galled by	Saperda populnea L.

HYMENOPTERA.

Rosa canina L.	galled by	Rhodites rosæ L.
Nepeta hederacea Trev.	,,	Aulax Glechomæ L.
Quercus Robur L.	,,	Cynips Kollari Hart.
Quercus Robur L.	,,	Biorrhiza pallida Oliv.
Quercus Robur L.	,,	Andriscus trilineatus Hart, f. radicis.
Quercus Robur L.	,,	Andriscus pilotus Adl., f. fecundator.
Quercus Robur L.	,,	Andriscus glandulæ Sch.
Quercus Robur L.	,,	Neurotus baccarum L.
Quercus Robur L.	,,	Neurotus baccarum f. lenticularis.
Salix Caprea L.	,,	Pontania proxima Lep.

DIPTERA.

Urtica dioica L.	galled by	Perrisia urticæ Perris.
Veronica Chamædrys L.	,,	Perrisia veronicæ Vall.
Pteris aquilina L.	,,	Perrisia filicina Kieff.
Populus tremula L.	,,	Harmandia petiola Kieff.
Populus tremula L.	,,	Harmandia Tremulæ Winn.
Rubus fruticosus L.	,,	Lasioptera rubi Heeger.
Cirsium arvense L.	,,	Urophora cardui L.
Salix caprea L.	,,	Rhabdophaga rosaria H.L.

HOMOPTERA.

Ulmus campestris L.	galled by	Schizoneura lanuginosa Hart.
Fraxinus excelsior L.	,,	Psyllopsis fraxini L.

LEPIDOPTERA.

It seems evident that the woodland was well worked for Lepidoptera before 1908, though only a few old records gleaned from the Victoria History of Kent and the "Woolwich Surveys" are available. Of these the Clouded Magpie (Abraxas sylvata Scop.), although fairly frequent in the woods since 1914, was once considered a rarity in the county, as the Victoria History has a note affixed to that record—"rare in the County of Kent since 1860, according to Mr. Webb." Of the remainder of these old records,

the following do not appear to have been observed in the woods during the last ten years :—

Calligenia miniata Forst. W.S.
Cidaria picata Hb. W.S.
Eubolia limitata Scop. W.S.
Chesias obliquaria Bork. VH.
Celæna haworthii Curt. W.S.
Agrotis tritici L. ab aquilina. W.S.
„ agathina Dup. W.S.
Noctua glareosa Esp. VH.
„ rhomboidea Tr. VH.
„ neglecta Hb. VH.
Orthosia ypsilon Bork. VH.
Cosmia trapezina L. VH.
Hadena pisi L. W.S.

The following list has been compiled by J. Juby and C. H. Hards, the result of numerous visits to the woods during 1919-24.

LEPIDOPTERA.

(258 species.)

RHOPOLACERA (Butterflies).

PIERINÆ.

Pieris brassicæ L.	Large White. M.
„ rapæ L.	Small White. M.
„ napi L.	Green Veined White. M.

NYMPHALINÆ.

Vanessa io L.	Peacock. M.
„ urticæ L.	Small Tortoiseshell. M.
Pyrameis cardui L.	Painted Lady. M.
„ atalanta L.	Red Admiral. M.

SATYRINÆ.

Epinephele janira L.	Meadow Brown. M.
„ tithonus L.	Gatekeeper. W.S.
Cœnonympha pamphilus L.	Small Heath. M.

LYCÆNIDÆ.

Chrysophanus phlœas L.	Small Copper. M.
Lycæna icarus Rott.	Common Blue. M.
Cyaniris argiolus L.	Holly Blue. M.

HESPERIIDÆ.

Pamphila thaumas Hufn.	Small Skipper.
„ sylvanus Esp.	Large Skipper. M.

HETEROCERA (Moths).

SPHINGIDÆ.

Dilina tiliæ L.	Lime Hawk.
Smerinthus populi L.	Poplar Hawk.
„ ocellatus L.	Eyed Hawk.
Sphinx ligustri L.	Privet Hawk. (Scarce.)

NOTODONTIDÆ.

Cerura vinula L.	Puss. M.
,, bifida Hb.	Poplar Kitten. M.
Drymonia trimacula Esp.	Marbled Brown.
Pheosia tremula Cl.	Swallow Prominent.
Notodonta ziczac L.	Pebble Prominent. W.S.
,, dromedarius L.	Iron Prominent. W.S.
Lophopteryx camelina L.	Coxcomb Prominent.
Phalera bucephala L.	Buff Tip.
Pygæra curtula L.	Chocolate Tip.

THYATIRIDÆ.

Habrosyne derasa L.	Buff Arches. M.
Thyatira batis L.	Peach Blossom.
Palimpsestis octogesima Hb.	Figure of Eighty.
,, or Fb.	Poplar Lutestring.
,, duplaris L.	Lesser Satin Moth.
,, flectuosa Hb.	Satin Carpet. M.
Polyploca flavicornis L.	Yellow Horned.

LIMANTRIIDÆ.

Orgyia antiqua L.	Common Vapourer.
Dasychira pudibunda L.	Pale Tussock. M.
Porthesia similis Fuess.	Gold Tail.
Stilpnotia salicis L.	Satin Moth.

LASIOCAMPIDÆ.

Malacosoma neustria L.	Lackey.
Lasiocampa quercus L.	Oak Eggar.

DREPANIDÆ.

Drepana falcataria L.	Pebble Hook Tip. M.
,, lacertinaria L.	Scalloped Hook Tip.
Cilix glaucata Scop.	Chinese Character.

NOLIDÆ.

Nola cucullatella L.	Short-Cloaked.

CHLOEPHORIDÆ.

Hylophila prasinana L.	Green Silver Lines.
,, bicolorana Fuess.	Scarce Silver Lines.

ARCTIIDÆ.

Spilosoma menthrasti Esp.	White Ermine. M.
,, lubricipeda Esp.	Buff Ermine.
Diaphora mendica Clerck	Muslin. M.
Arctia caia L.	Garden Tiger.

HYPSIDÆ.

Hipocrita jacobææ L.	Cinnabar.

LITHOSIINÆ.

Lithosia complana L.	Scarce Footman, 1 specimen, 1922, taken by J. Juby.

ACRONYCTINÆ.

Acronycta leporina L.	The Miller.
,, aceris L.	Sycamore.
,, megacephala Fb.	Poplar Grey.
psi L.	Grey Dagger.

ACRONYCTIDÆ.

Bryophila perla Fb.	Marbled Beauty.

TRIFINÆ.

Agrotis segetum Schiff.	Turnip Moth.
,, puta Hb.	Shuttle Shaped Dart.
,, corticea Hb.	Heart and Club. (Scarce.) M.
,, nigricans L.	Garden Dart.
,, exclamationis L.	Heart and Dart.
,, ypsilon Rott.	Dark Sword Grass.
,, saucia Hb.	Pearly Underwing.
Noctua augur Fb.	Double Dart.
,, baja Fb.	Dotted Clay.
,, C-Nigrum L.	Setaceous Hebrew Character.
,, ditrapezium Bork.	Triple Spot Clay.
,, brunnea Fb.	Purple Clay.
,, triangulum Fb.	Double Square Spot.
,, festiva Hufn.	Ingrailed Clay.
,, var. conflua Hb.	Lesser Ingrailed Clay.
,, dahlii Hb.	Barred Chestnut.
,, rubi View.	Small Square Spot.
,, umbrosa Hb.	Six Striped Rustic.
,, xanthographa Fb.	Square Spot Rustic.
,, plecta L.	Flame Shoulder.
Triphæna comes Hb.	Lesser Yellow Underwing.
,, pronuba L.	Large Yellow Underwing. M.
,, fimbria L.	Broad Bordered Yellow Underwing.
,, ianthina Esp.	Lesser Broad Bordered Yellow Underwing.

SUB HADENIDÆ.

Mamestra brassicæ L.	Cabbage Moth.
,, persicariæ L.	The Dot.
,, oleracea L.	Bright Line Brown Eye.
,, genistæ Bork.	Light Brocade.
,, thalassina Rott.	Pale Shouldered Brocade.
,, pisi L.	The Broom.
,, trifolii Rott.	The Nutmeg.
,, dentina Esp.	The Shears.
Aplecta nebulosa Hufn.	Grey Arches.
Dianthœcia cucubali Fuess.	The Campion.
Hecatera serena Fb.	Broad Barred White.
Neuria reticulata Vill.	Bordered Gothic.
Eumichtis adusta Esp.	Dark Brocade.
,, protea Bork.	Brindled Green.
Luperina testacea Hb.	Flounced Rustic.
Cerigo matura Hufn.	Straw Underwing.
Hama sordida Bork.	Large Nutmeg.
Apamea gemina Hb.	Dusky Brocade.
,, basilinea Fb.	Rustic Shoulder Knot.
,, secalis L.	Common Rustic. M.
Miana strigilis Clerck	Marbled Minor.
,, fasciuncula Haw.	Middle Barred Minor.
,, literosa Haw.	Rosy Minor.
,, bicoloria Vill.	Cloaked Minor.
Phothedes captiuncula Tr.	Least Minor.

Xylophasia rurea Fb.	Clouded Border Brindle.
,, lithoxylea Fb.	Light Arches.
,, monoglypha Hufn.	Dark Arches.
,, hepatica L.	Clouded Brindle.
Dipterygia scabriuscula L.	Bird's Wing. W.S.
Miselia oxyacanthæ L.	Green Brindled Crescent.
Euplexia lucipara L.	Small Angle Shades.
Phlogophora meticulosa L.	Angle Shades. M.
Mania maura L.	Old Lady.
Nænia typica L.	Gothic.
Hydræcia nictitans Bork.	The Ear.
,, micacea Esp.	Rosy Rustic
Ochria ochracea Hb.	Frosted Orange.
Leucania pallens L.	Common Wainscot.
,, impura Hb.	Smoky Wainscot.
,, comma L.	Shoulder Striped Wainscot.
,, lithargyria Esp.	Clay.
,, conigera Fb.	Brown Line Bright Eye. M.
Grammesia trigrammica Hufn.	Treble Lines.
Caradrina morpheus Hufn.	Mottled Rustic. M.
,, alsines Brahm	Uncertain.
,, quadripunctata Fb.	Pale, Mottled Willow.
Petilampa arcuosa Haw.	Small Dotted Buff.
Rusina tenebrosa Hb.	Brown Rustic.
Amphipyra pyramidea L.	Copper Underwing. (Scarce.)
,, tragopogonis L.	Mouse.
Tæniocampa gothica L.	Hebrew Character.
,, pulverulenta Esp.	Small Quaker.
,, stabilis View	Common Quaker.
,, incerta Hufn.	Clouded Drab.
,, munda Esp.	Twin Spotted Quaker.
,, gracilis Fb.	Powdered Quaker.
Calymnia pyralina View.	Lunar Spotted Pinion. Larvæ only.
,, affinis L.	Lesser Spotted Pinion. Larvæ only.
,, diffinis L.	White Spotted Pinion. W.S.
,, trapezina L.	Dun Bar.
Dyschorista fissipuncta Haw.	Dingy Shears.
Omphaloscelis lunosa Haw.	Lunar Underwing.
Amathes lota Clerck	Red Line Quaker.
,, macilenta Hb.	Yellow Line Quaker.
,, circellaris Hufn.	The Brick.
,, lychnidis Rbr.	Beaded Chestnut.
,, litura L.	Brown Spot Pinion.
Cosmia citrago L.	Orange Sallow.
,, lutea Strom.	Pink Barred Sallow.
,, fulvago L.	The Sallow.
Orrhodia vaccinii L.	The Chestnut.
,, ligula Esp.	Dark Chestnut.
Eupsilia satellitia L.	The Satellite.
Xylocampa areola Esp.	Early Grey. W.S.

CUCULLIIDÆ.

Cucullia umbratica L.	Shark. M.

QUADRAFINÆ.

Plusia chrysitis L.	Burnished Brass. M.
,, gamma L.	Silver Y. M.
Abrostola triplasia L.	Dark Spectacle.

DELTOIDÆ.

Zanclognatha tarsipennalis Tr.	Fan Foot.
,, nemoralis Fb.	Small Fan Foot.
Herminia derivalis Hb.	Clay Fan Foot. (Scarce.)
,, barbalis Clerck	Common Fan Foot.
Hypena proboscidalis L.	The Snout. M.
,, rostralis L.	Buttoned Snout.

CATOCALIDÆ.

Catocala nupta L.	Red Underwing. M.

GEOMETRIDÆ.

Pseudoterpna pruinata Hufn.	Grass Emerald. (Scarce.)
Geometra papilionaria L.	Large Emerald. M.
,, vernaria Hb.	Small Emerald. M.
Phorodesma bajularia Schiff.	Blotched Emerald.
Iodis lactearia L.	Little Emerald.
Hemithea strigata Mull.	Common Emerald. M.

ACIDALIINÆ.

Acidalia virgularia Hb.	Small Dusty Wave.
,, straminata Tr.	Dotted Border Wave.
,, aversata L.	Riband Wave. M.
,, bisetata Hufn.	Small Fan Foot Wave.
,, trigeminata Haw.	Treble Brown Spot.
Timandra amataria L.	Blood Vein. M.
Ephyra linearia Hb.	Clay Triple Lines.

HYDRIOMENINÆ.

Lobophora sexalata Hb.	Small Seraphim.
Chæimatobia brumata L.	Winter Moth. M.
Scotosia certata Hb.	Scarce Tissue. (Scarce.)
Eustroma silaceata Hb.	Small Phœnix.
Lygris associata Bork.	Spinach.
Cidaria corylata Thnbg.	Broken Barred Carpet.
,, truncata Hufn.	Common Marbled Carpet. M.
,, immanata Haw.	Dark Marbled Carpet.
Coremia quadrifasciaria Clerck	Large Twin Spot Carpet.
,, ferrugata Clerck	Red Twin Spot Carpet.
Larentia viridaria Fb.	Green Carpet. (Scarce.)
,, didymata L.	Twin Spot Carpet.
Oporabia dilutata Bork.	November Moth. M.
,, autumnata Gn.	Autumnal Moth.
Xanthorhoe montanata Bork.	Silver Ground Carpet.
,, fluctuata L.	Garden Carpet. M.
,, rivata Hb.	Wood Carpet.
,, sociata Bork.	Common Carpet.
Melanthia albicillata L.	Beautiful Carpet. W.S., M.
,, ocellata L.	Purple Bar Carpet.
Perizoma affinitata Steph.	The Rivulet.
Camptogramma bilineata L.	Yellow Shell. M.
Hydriomena furcata Thnbg.	July Highflyer.
Anticlea badiata Hb.	Shoulder Stripe.
Asthena candidata Schiff.	Small White Wave. M.
Eupithecia oblongata Thnbg.	Lime Speck Pug.
,, pulchellata Steph.	Foxglove Pug. W.S.
,, vulgata Haw.	Common Pug.
,, haworthiata Dbl.	Haworth's Pug.

Eupithecia nanata Hb.	Narrow Winged Pug.
,, abbreviata Steph.	Brindled Pug.
,, dodoneata Gn.	Oak Tree Pug.
,, coronata Hb.	V. Pug.
,, rectangulata L.	Green Pug.
Cœnocalpe tersata Hb.	The Fern.

BOARMIINÆ.

Abraxas sylvata Scop.	Clouded Magpie. W.S., M.
,, grossulariata L.	Magpie.
Lomaspilis marginata L.	Clouded Border. M.
Ligdia adustata Schiff.	Scorched Carpet.
Cabera pusaria L.	White Wave. M.
Metrocampa margaritaria L.	Light Emerald.
Ennomos quercinaria Hufn.	August Thorn.
,, alniaria L.	Canary-Shouldered Thorn.
Selenia bilunaria Esp.	Early Thorn.
,, var. juliaria Haw.	
Pericallio syringaria L.	Lilac Beauty. (Scarce). M.
Gonodontis bidentata Clerck	Scalloped Hazel. M.
Crocallis elinguaria L.	Scalloped Oak.
Angerona prunaria L.	Orange Moth. (Scarce.) M.
Rumia luteolata L.	Brimstone Moth. M.
Venilia maculata L.	Speckled Yellow.
Macaria notata L.	Peacock Moth. M.
Hybernia rupicapraria Hb.	Early Moth.
,, leucophæaria Schiff.	Spring Usher.
,, aurantiaria Esp.	Scarce Umber.
,, defoliaria Clerck	Mottled Umber. M.
,, marginaria Bork.	Dotted Border.
Anisopteryx æscularia Schiff.	March Moth. M.
Phigalia pedaria Fb.	Pale Brindled Beauty. M.
Biston hirtaria Clerck	Brindled Beauty.
Pachys strataria Hufn.	Oak Beauty. (Scarce.)
,, betularia L.	Peppered Moth.
and var. doubledayaria Mill.	
Synopsis abruptaria Thnbg.	Waved Umber.
Boarmia gemmaria Brahm	Willow Beauty.
,, repandata L.	Mottled Beauty.
,, consortaria Hb.	Pale Oak Beauty. M.
Tephrosia bistortata Goeze.	Engrailed. M. (Scarce.) 1924, J. Juby.
,, crepuscularia Hb.	Small Engrailed.
,, luridata Bork.	Brindled White Spot. W.S.
,, punctularia Hb.	Grey Birch.
Halia wauaria L.	V Moth. M.
Panagra petraria Hb.	Brown Silver Line.

SESIIDÆ.

Ægeria crabroniformis Lewin	Lunar Hornet Clearwing.
Sesia vespiformis Lasp.	Yellow-Legged Clearwing. (Scarce). M.
,, culiciformis L.	Large Red Belted Clearwing.

HEPIALIDÆ.

Hepialus humuli L.	Ghost Swift. M.
,, sylvina L.	Orange Swift.
,, lupulina L.	Common Swift. M.
,, hectus L.	Gold Swift. W.S.

Abbreviation. M = Collected by the Writer, 1914-18.

MOLLUSCA.

It would appear that the late Rev. Canon J. W. Horsley, M.A., who worked out the Mollusca so well for the district, only recorded one species, Jasminia cylindracea, for the woodland. Of the few other species listed the majority are the result of a few hours search with A. S. Poore, who is responsible for their determination. It is evident that systematic study would considerably augment the list, whilst at the same time much might be added to our knowledge of the mycophagous propensities of both slugs and snails. It is noteworthy that Pomatias elegans, a chalk-loving operculate snail, is frequent on some of the shell-beds ; Helix hispida is one of the most abundant species in the woods.

Nomenclature.	Woolwich Surveys.
Agriolimax agrestis Linné.	
Vitrea cellaria Muller.	
Arion ater Linné.	
,, hortensis Fer.	
Helicigona lapicida Linné.	
Helix aspersa Muller.	
,, rotundata Muller.	
,, nemoralis Linné.	
,, hispida Linné.	
Jasminia cylindricea Da Cost.	(W.S. 1906.)
Clausilia laminata Mont.	
,, rugosa Drap.	
Limnæa truncatula Muller.	Pine Pool.
Planorbis contortus Linné.	Pine Pool.
,, sp.	Pine Pool.
Pomatias elegans Muller.	

FOSSILS.

BLACKHEATH SHELL-BEDS.

The only old records available are a number of fossils obtained by the late eminent geologist, W. Whitaker, F.G.S., who published an account* of them in 1872. In one of his later works,† dated 1889, these fossils are again referred to *ad seq.* "From the earth turned out from rabbit holes in sandy pebble-beds in Abbey Wood I got the following fossils :

> Lamna teeth, Cerithium, Fusus, Melania (?), Melanopsis, Neritina, Cyrena cordata, Cyrena cuneiformis, Cyrena tellinella, Nucula, Pentunculus (large), Ostrea."

* Geology of London Basin, p. 254.
† Geology of London, Vol. I., p. 231.

Since the above list was first published no additional fossils appear to have been recorded from the shell-beds in the woods until this year (1924), though an old rabbit burrow, enlarged by dogs, with fragments of Ostrea and Cyrena scattered around, was in evidence when the writer first began to visit the woods more than ten years ago. That burrow still remains open, although concealed by privet and other vegetation. It is possible, especially as until recently no other burrow had been observed to reveal shells, that it is identical with the one from which the above listed fossils were obtained. As previously mentioned, six Blackheath shell-beds are now known in the woods all showing fragments of Ostrea or other shells on the surface. During last winter (1923-4) from one of these beds near Ashe Hill path (Sec. VII.), marked 130ft. O.D., rabbits scratched up such a quantity of shells that a thorough investigation of the bed was desirable. In March, at the suggestion of S. Priest, F.G.S., a number of the shells and teeth were forwarded to A. Wrigley who determined about eighteen species. Later, after digging had revealed the shells in lenticles at a depth of about four feet, A. Wrigley and A. G. Davis joined in the search for specimens. Since then numerous additional small teeth, bones and shells have been collected. At the end of October, A. Wrigley most kindly forwarded the following list for which he is responsible :—

Ostrea sp. probably bellovacina Lk. C.
Glycymeris plumsteadiensis (J. Sow.)
Nucula fragilis Desh. C.
Protocardium plumsteadianum (J. Sow.).
Cyrena forbesi Desh. A.
,, cuneiformis Fer. C.
,, tellinella Fer. A.
Corbula morrisi Edw. M.S. (= C. regulbiensis var. B. Morris).
,, (agina) arnouldi Nyst. C.
Corbulomya antiqua Desh. C.
Barnea levesquei (Wat.).
? Siphonalia mariæ (Meller)—juvenile.
Tritonidea luta (J. Sow.).
Parvisippo n. sp. aff. infracoccnica Cossm.
Pseudoliva fissurata Desh.
Terebra plicatula Lamk. N.
Odontostomia regularis Edw. Ms.
Tympanotomus funatus (Mant.). C.
Melanatria inquinata (Defr.). C.
Melanopsis buccinoidea Fer. A.
Bayania triticea (Desh.). N.
Naticina abducta (Desh.). C.
,, labellata (Lamk.).
Calyptræa sp.
Theodoxus subornatus (Meller). C.
,, ?? jaspidea (Desh.).
Tornatellæa simulata (Sol.).
Membranipora sp.
Planorbis hemistoma (J. Sow.)
Toredo sp.

Otoliths (earbones of fish).
Sharks' teeth.

Abbreviations : C = Common ; A = Abundant. ; N = "Not hitherto recorded as found in England, although known from the coeval Sables de Sinceny in North France."

In addition to the above, palatal teeth, bone fragments and armour plates have been collected from time to time and forwarded to A. G. Davis who paid another visit to the bed in search of teeth during October. A full account of all these remains will be published when E. I. White, of the British Museum, has examined all the material. So far seven species, including one new genus, have been accounted for, representing rays, skates and other fishes. E. I. White considers that the fish fauna is of exceptional interest, and that it much resembles the molluscan fauna in that an examination of part of the material has shown that fresh water, brackish and marine forms, are all represented. The rich fauna of this shell-bed has furnished additional evidence for assigning our Blackheath deposits to the same age as the Sinceny beds of France. (See Appendix C).

My gratitude is due to A. Wrigley, A. G. Davis, and E. I. White, for their invaluable assistance.

On March 9th, 1925, another portion of the same shell-bed (Sec. VIII., shaded portion), at an altitude of about 140 feet, was dug up by F. J. Epps, A. S. Poore and the writer. This shell-bed was reached at a distance of twenty inches below the surface. It consisted of a compact mass of small shells, embedded amongst sand and pebbles, with here and there thin layers of Ostrea, the latter more noticeable in the upper part and near the base of the bed. The mass averaged about three feet in depth. So far only a very small quantity of the material collected from this bed has been examined,* so that the following list is not fully representative :—

Ostrea bellovacina Lk. C.
Glycymeris plumsteadiensis (J. Sow.)
Cyrena forbesi Desh.
„ tellinella Fer. A.
Pseudoliva fissurata Desh.
Tympanotomus funatus (Mant.). C.
Melanatria inquinata (Defr.). C.
Melanopsis buccinoides Fer. C.
Naticina abducta (Desh.).
Theodoxus subornatus (Meller).
Sharks' teeth.
Vertebræ.

* See Appendix C.

THE CHALKY DELL.

The Upper Chalk represented in this dell is fairly rich in fossils though it does not appear to have been thoroughly worked. Many of the fossils are in a fragmentary condition though a few excellent specimens have been obtained. Of those recorded the majority have been collected by F. J. Epps and S. Priest, F.G.S., who have kindly supplied the following list :—

Micraster coranguinum Leske, the zone fossil—often much crushed and with Ostrea and Serpula attached.
Echinocorys scutatus Leske
Conulus albogalerus Leske
Cidaris spines.
Crinoid ossicles.
Spondylus spinosus (J. Sowerby)—usually abundant in the Micraster coranguinum zone.
Pecten sp.
Terebratula sp.
Rhynconella sp.
Inoceramus sp.
Ostrea—free, and attached to echinoderms.
Fish teeth and scales.
Serpula—free, and attached to other fossils.
Terebella lewesiensis Mantell
Ventriculites and other sponges.
Polyzoa sp.

APPENDIX A.

(See page xi. of the Historical Preface.)

It is stated in A. W. Clapham's work that "the ancient name for the Abbey was variously written Lesnes, Lessness, Liesnes, Lesney, Lesons, Leosnes, Lesing." To these variants E. Salter-Davis has kindly added the following: Leosne, Lensa, Loisness, Lysnes, Hlesnes, though he "cannot vouch for the authenticity of those spellings as the correspondent concerned refers only to the Invicta Magazine—C. J. Redshaw, as his authority." In the Domesday Book Loisnes is used.

Of those consulted with regard to the ancient name of the Abbey, C. F. Hardy points out that Lesnes is used by Stukeley, 1752; by Hasted in the History of Kent, 1st Edit., Vol. I., 1778; as also in the "Kentish Traveller's Companion," 3rd Edit., 1790. He is entirely in favour of the use of Lesnes "adopted by recognised authorities for upwards of one hundred years." F. S. Lamprey, M.A., quotes Symmondson's map, dated 1596, as alluding to the Abbey as Lesnes and he also states that he is "informed that the same spelling is used on the Plea Rolls of 1220." In addition he mentions "Place Names of Kent," by the late Canon Horsley, who derived the Abbey name from the A.S. *Lewes* = pasture, and *ness* = promontory, but he "doubts if there is a sufficiently pronounced promontory."

F. O. Whitaker believes that if the authenticity of Hlesnes can be proved, the name of the ancient Abbey was Lesness. He derives Hlesnes from the A. S. Hleo = a lee or shelter, and ness = a promontory, which he thinks is descriptive of the Abbey which stood on a promontory on the sheltered side of the river. He considers that the dropping of the final *s* in Hlesnes is purely accidental. W. H. Mandy, B.A., declares for Lesnes, he objects to Lessness "because it is trying to beg the question of derivation." It is evident that the consensus of opinion is in favour of Lesnes, but in addition to the above mentioned reasons we have used Lessness as that word allows a purely English pronunciation.

APPENDIX B.

OZONIUM.

(See page 38—Fungi.)

Plowright, C. B. Trans. Brit. Myc. Soc., Vol I, p. 181, refers Ozonium auricomum to *Coprinus domesticus*. Also states that *Coprinus micaceus* and. *C. similis* have an Ozonium form.

Rea, Carleton. Trans. Brit. Myc. Soc., 1906, p. 166. He found *O. auricomum* in association with *C. radians* (Desm.) Fr: he quotes Quelet who came to the same conclusion.

Brooks, F. T. Trans. Brit. Myc. Soc., IV., 1913, p. 248. Ozonium on a charred log developed into a *Coprinus* (probably *C. radians*), after more than a year. A spore deposit was obtained and pure cultures grown on blocks of elm. The tawny mycelium was reproduced again. (Probably the first time from spores.)

Biers, P. M. "Le Coprinus radians (Desm.) Fr. est-il parasite?" Bull. Soc. Path. Veg. de France. T. VI., pp. 72-74, 1919.
Takes it as undoubted that O. auricomum belongs to *C. radians*.

APPENDIX C.

BLACKHEATH SHELL-BEDS.

(See page 69.)

In a later communication (dated March 29th), A. G. Davis states that only a few of the remains collected in the first part of the bed examined (Sec. VII.) have been determined, but several fishes not recorded previously for the deposit are represented. Also that the mixture of freshwater and marine fishes is indicated by the presence of Lepidosteus and Myliobatis.

The more recently opened portion of the bed (Sec. VIII.) has not proved so rich in either shells or fish remains as the first part, nor are the shells in it so well preserved.

Additions to this part of the bed are :—

Nucula sp.
Tritonidea luta (J. Sow.).
Odontosmia regularis Edw. Ms.
Bayania triticea (Desh.).
Teredo antennatæ Sby.
Polyzoa sp.
Fish scales.
Palatal teeth.
Bony dermal plates of Lepidosteus.
Coprolite.

Many of the specimens were collected by F. J. Epps. Of those listed, all have been kindly determined by either A. Wrigley, A. G. Davis, or E. I. White. My thanks are due to A. S. Poore for his unselfish aid in digging up the beds.

Just before going to press a few other specimens, obtained by F. J. Epps and the writer in the first bed, were provisionally determined by A. G. Davis, *ad seq.* :—

Complete palate of Phyllodus, considered to be unique.
Fragment of coral, approaching the Paris Basin species.
Conical teeth of Lepidosteus. (One found previously.)
Circular fish remains, considered rarities.

Also, a shell, determined by A. Wrigley as Nerita semilugubris Desh, "not recorded previously for Britain but known and named in France."

The examination of the fish remains and the investigation of the bed is still proceeding.

No. I.—Pine Pool looking North-East

No. II.—The Cundite Pond.

No. III.—Section in the Chalky Dell (taken at a distance).

IV.—Same Section as No. III. (nearer view).

No. V.—Section at Tuff & Hoar's Pit, East Wickham.